THE
green scene
HORTICULTURE IN THE DELAWARE VALLEY
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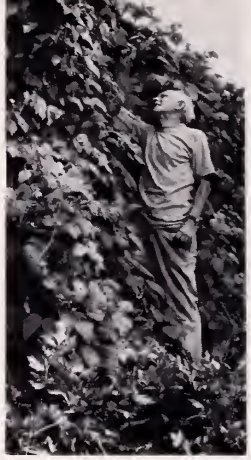


Planting Rocks


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HORTICULTURE IN THE DELAWARE VALLEY

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Front Cover:	The Ballard rock garden on the front cover is the end result of the construction story told by Frederic Ballard on page 4. The photograph was taken in the fall and prominently features sweet alyssum, dianthus, portulaca and gentian *(G. scabra saxatilis).*
Back Cover:	The same garden in spring.

Front cover by Ernesta D. Ballard

Back cover by Edmund B. Gilchrist, Jr.



RETROSPECT AND PROSPECT

With this issue we begin our fifth year of publication, a year that will see the end of the nation's bicentennial and the beginning of the Society's sesquecentennial. During the past year or two, we at the Society have been doing a good deal of reading of old books and culling of old records in preparation for these venerable anniversaries. We know much more about the history of horticulture, and of our Society, than we knew when Volume 1, Number 1 of *The Green Scene* was published.

We hope that this contemplation of the past has given us a new perspective for the future. It is a bit sobering to pore over plans and descriptions of magnificent 19th century gardens and shows and then pick up a gardening book of the period and find it devoid of any advice on fertilizing or pest control. It is equally sobering to reflect on the techniques needed to transport plant material via horseback or sailing ship, or to realize that Mr. Pratt's hothouses at Lemon Hill contained plants that are difficult to buy today. Victorian gardeners routinely grew tropical ferns that many modern houseplant fanciers have never heard of.

It is also thought-provoking to review the number and variety of horticultural publications that have appeared, and disappeared, during the past two centuries. To us this flux says that people's interests and tastes are constantly changing, and any periodical that does not adjust to the times is doomed. The problem of adjustment is particularly difficult for us because we have a captive audience. We cannot consult that most sensitive of all indices, the circulation report. We have to rely on your reactions.

So, please, let us know what you like — and what you dislike. If you have an idea for an article, send it to our editor. If you take issue with one of our authors, write us about it. This is your magazine.

Ernesta D. Ballard
President

PLANTING ROCKS
or
some thoughts on constructing a rock garden

Figure 1. Rock outcrop at Sugar Loaf in Chestnut Hill. The model for the author's construction.



photos by Edmund B. Gilchrist, Jr

by Frederic L. Ballard

Ballard is a Philadelphia lawyer who has walked, ridden or jogged in the Wissahickon Valley nearly everyday of his life. His horticultural success could be the result of his observations in this unique valley.

A rock garden should be an attractive setting for alpines and other rock garden plants. If that definition sounds too simple to be helpful, consider for a moment what it eliminates. It tells us, for example, that a rock garden need not be a replica of an alpine scree or a terminal moraine; there would be no point in trying to duplicate one of these habitats, since you could never duplicate the climate that goes with them. Nor is a rock garden the most convenient place in which to grow alpines, as any rock gardener will tell you. The real message of the definition is that a rock garden's function is, first, to provide a complimentary background for the diminutive and unassuming plants that rock gardeners grow, and, second, to suggest the conditions in which many of these plants are found in nature.

As in architecture, so in rock gardens, form follows function. If the function is to suggest a natural setting, the form should resemble nature insofar as practicable. In this regard it is not necessary to go to quite such lengths as did Sir Frank Crisp in constructing his famous garden at Friar Park, Henley. Sir Frank elected to build a faithful reproduction of the Matterhorn on a scale of about three acres, using 7,000 tons of limestone, a brook, a lake, and a miniature Swiss chalet. In 1911 English critics were reported to be divided as to Sir Frank's efforts, but one thing stands to his credit. He used nature as a model, and that alone ranks him ahead of at least half of those who build rock gardens in the Delaware Valley today.

In making our rock garden, I followed the same approach as Sir Frank, but on a considerably smaller scale. Living, as I do, in Chestnut Hill, which is pockmarked with rock outcrops, I spent several weeks studying these and trying to get a feel for their structure. Finally, I narrowed my examination down to an exposure of so-called "Chestnut Hill stone" near the swimming pool at Sugar Loaf (the Albert M. Greenfield Conference Center of Temple University). It is pictured in figure 1.

Two things are noticeable about the outcrop in figure 1. First, the exposed rock is only a shoulder of the bedrock

continued



Figure 2. Quarrymen wrestle larger stones into the excavation.

PLANTING ROCKS continued



Figure 3

Figure 3. "Endless fussing is what it takes. . . . Have patience and you will prevail."

Figure 4. A crowbar establishes the slope from the high point to the right-hand boundary.

Figure 5. Author works on a third slope.

Figure 6. Completed and unplanted.



Figure 4

beneath; you can sense that the underlying structure extends outward in all directions. Second, the rock has a distinct grain, with long ridges and crevices running parallel to one another. These characteristics produce a sense of stability and order quite different from the jumble one would find at the bottom of a rockslide. Since order and stability seem to me to be desirable in a garden, especially a small one, I made it my objective to achieve the same effect.

The first step was to choose a site. Here, the logic is clear, and the books are unanimous. It is possible to grow ferns and moss and such in a shady, watery rock garden, but an alpine rock garden needs light and drainage. Usually this will mean a slope facing between southeast and southwest and receiving direct sunlight for at least eight hours in a summer day.

For material, I selected Chestnut Hill stone. In addition to being the stone that forms the Sugar Loaf outcrop, it was also the stone used in our house and terraces, and indeed, in most of the masonry in the Chestnut Hill community. I thought (correctly, as it turned out) that the use of a local stone would contribute to the naturalness and harmony of the garden. Also, of course, local stone offers the advantage of being near at hand.

At the quarry, I was informed that what I wanted were "cap" stones; i.e., stones broken out of the upper layers that the quarryman throws aside in order to expose the bedrock from which hard stones, usable in masonry, can be cut. Capstones tend to be soft and weathered, which makes them ideal for a rock garden. They are also large and irregular in shape, since the quarryman makes no effort to dress them.

In the quarry I visited, there was a good supply of capstones running 3 to 4 ft. in length. They were made up of many thin parallel layers laminated into

continued



Figure 5



Figure 6



Figure 7. Completed. This photograph was taken in the fall.

a single structure, like a piece of plywood. Their width (i.e., the dimension parallel to the layers) was as much as 2 ft. Their thickness varied from 6 in. to one ft. It seemed to me that rocks of this size would establish an acceptable scale for the garden, not to mention that they were about as large as could be handled without heavy equipment.

Having gotten a feeling for the stones, I excavated the site. That is to say, I dug a hole the size and shape of the outcrop I had in mind, and 16 to 18 in. deep, the thought being that a stone 2 ft. wide lying on edge would protrude 6 in. or so above the surface. I let the bottom of the excavation come gradually up to grade at the lower end of the slope so that rain water would drain out. I then proceeded to lay in a good supply of sand, six or eight large capstones, 20 or 30 smaller ones of various sizes, several bushels of stone chips, and two patient quarrymen to handle them. The quarrymen are essential for transporting the stones to the site and wrestling the larger ones into the hole. You can see them doing this in figure 2. But after the stones are roughly in place, the quarrymen can go. There is no point in paying them to stand around while you fuss endlessly with placement.

And endless fussing is what it takes. First, you establish the plane of the layers, which in turn establishes the plane of the cracks between the stones in which the plants will grow. The long axis of this plane should run parallel to the long axis of the outcrop. In our garden I made the cross axis of the plane vertical—that is, I stood the piece of plywood on its edge. But I now think it would look better if the plane were inclined as much as 30° toward the sunny exposure.

The next step is to place the larger stones, making certain that they are close together and that their layers are parallel to the plane you have established. That is important. Even a slight deviation from the plane will produce a kink in the grain that is quite displeasing to the viewer. If you start placing the stones at the bottom of the slope, let us say the southern end of the excavation, you will find it rather easy to construct a gradually rising outcrop ascending in a northerly direction, with a more or less flat face falling away toward the east. That flat face will have a network of long crevices between the edges of the stones and shorter pockets at their ends, providing an excellent exposure on which to grow alpines. But what are you going to do on the western and northern slopes? How are you going to descend from the high point to the outer boundaries without betraying the artificial nature of your construct?

All I can say is, have patience and you will prevail. I have the pictures to prove it. Figure 3 shows a number of the larger stones in the hole with their long dimensions aligned in parallel to produce the grain of the outcrop. They are resting on edge on 2 or 3 in. of sand, and, when necessary, are wedged in position with small stones and chips. Figure 4 shows the use of a straight edge (in this case a crowbar) to establish the slope from the high point to the right hand boundary. Figure 5 shows two slopes, the one toward the right shown in figure 4 and another toward the left, with the author working on a third slope toward the rear. In between these pictures there were innumerable adjustments of individual stones, propping up one end, excavating to lower the other, sliding one stone along another to avoid having all the joints fall in the same line, rearranging to make numerous small planting pockets rather than a few big ones, and always remembering to maintain the basic plane of the layers. The essential thing is to take your time. Keep circling your garden to get a feel of how it will look from every angle. If one of the stones seems uncomfortable, do something about it. Don't give up until it looks right.

When the stones are finally in place, you are ready to fill in the crevices between them. For this I used coarse builder's sand mixed with compost in about equal parts by volume. Work the mixture thoroughly into the crevices with a stick and a flow of water from a hose; you will be surprised how long it takes and how much material is needed.

As you fill the crevices, you will find some that hold the sand nicely, and others with an open side through which the sand runs out. Use small stones and chips to dam these openings so that all planting pockets can be filled almost to their rims. These pockets tie the separate stones together visually, making them look like a single rock ledge that has split and fissured. The effect can be enhanced by breaking up a number of the stones with a hammer and scattering the stone chips on top of the sand.

At this point we pass from landscape construction to alpine growing, which is outside the scope of this article. I do, however, call your attention to figures 6 and 7 which show the garden I have been describing just after construction and about 18 months later. In actuality this garden was made in four increments, several years apart, the section nearest the camera in figures 6 and 7 being the one under discussion. You can see that the effect is reminiscent of the Sugar Loaf outcrop, so much so that one or two visitors have paid me the supreme compliment of mistaking it for a natural formation.

In closing I would stress these things: first, use large stones and bury them so that no more than one-fifth of their bulk protrudes above the surface. Second, put your stones so close together that they will look like a unified formation. Third, don't feel that you should try to recreate the Sugar Loaf outcrop. Find a natural model of your own; there are scores of different kinds. But whatever model you choose, strive for unity and harmony. Without them you will never have an attractive setting for your plants—which is what the exercise is all about.

●

a climate for perennials

by John E. Kaltenbach

John Kaltenbach retired as proprietor of Garden of the Trees where he grew and propagated more than 750 species of perennials. Still active, he chairs the East Brandywine Planning Commission, which last year adopted a comprehensive plan based on land capability rather than land use.

Relatively few areas on the face of the earth can match the Delaware Valley region for growing perennials. Downwind from a continental land mass, between the oldest mountains on earth and the Atlantic Ocean, at the head of two large bays fed by numberless rivers, traversed by Arctic blasts and tropical hurricanes, we can bring into bloom anemone from Tierra del Fuego and Nepal, agastache from Mexico, aquilegia from the Rockies, artemisia from the desert Southwest, actinea from the Great Lakes shores, anacyclus from the Atlas Mountains of Africa, campanula from Italy, delphinium from Formosa, digitalis from the Caucasus, draba from Greenland, catananche from the Mediterranean, duchesnea from the South Pacific, santolina from Greece, epimedium from Japan, geum from Chile, helianthemum from Britain, hellebore from Southern Europe, iris from Siberia, leontopodium from the Alps, nierembergia from the Argentine, hosta from China, and begonia from Java. Not only can we bring them to bloom, but we can winter them and summer them, all outdoors, without the cost of artificial housing and without the labor of lugging containers indoors and out as the seasons change.

The key to successfully growing perennials is an understanding of climate. Climate does not consist of daily fluctuations of local weather except as these are understood to be part of a vast, long-range pulsation of the aggregate effects of rainfall, humidity, wind, sunlight, shade, exposure, slope, and temperature. Our understanding of climate does not consist of simple adjustment to the fact that we are in Zone 6, but in development of full consciousness that while the air we breathe today may have been over the Polar ice cap a week ago, tomorrow may find us engulfed in moisture that originated in the Sargasso Sea. Such gigantic planetary forces, combining with the spin of earth and the tilt of its axis, create climate: world climate, continental climates, ocean climates, Piedmont climate, Delaware Valley climate, the particular climate of the valley or hill where you live, the specific climate of your perennial border, and the microclimate in which each plant lives.

A second need is to understand the relation between climate and soils. We need to rid ourselves of the tyranny of soils. Most plants have already done so. Once we understand that all soils are the product of climate, laid down by weathering of parent rock and the accretion of plant and animal residue, we gain the freedom that comes with making soil rather than "feeding plants." Any soil rich in humus is fit to grow perennials. The climatic conditions above and around and in the soil are of much greater significance to perennial survival and growth than the soil type itself.

The plants that can survive in any climate are determined primarily by the amount of heat and light available. Where plants can grow and how they are distributed is primarily controlled by water. A dynamic relationship, usually inverse, exists between heat and water. An increase of one usually results in a decrease of the other through the mechanism of evaporation. Under natural conditions we can see this relationship at work in our region where we find tree species, birch, maple, beech, hemlock on the northern slope of a ridge, while the southern side of the same ridge, in the same soil series, will grow oak, tulip poplar, walnut, and locust.

Trees are at the evolutionary summit of perennial plants, although we do not customarily recognize this fact, even when it is pointed out to us that the same sequence of events that accompanied the development of humans in the animal world produced trees in the plant world. They are the true perennials, our full brothers in the plant kingdom. Once we accept this fraternal relationship we can more easily understand the importance of climate to perennials, particularly those flowering kinds we grow in our gardens. They become not only a source of beauty and inspiration and decoration for the table, but barometers of the state of our environment and our society. How they are doing is a reflection of how we are doing, and consciously or unconsciously we become linked in a symbiotic relationship with what we grow.

In colonial days, as a point of illustration, the morning fields of this countryside came alive with spreading reaches of blue flax that mirrored in dewy brilliance the clarity of the sky above. Gradually the buildup of heat combined with our prevalent humidity to promote a fungus that wiped out the flax fields and left our ancestors to buy their linen abroad. My forebears grew flax between the Schuylkill and the Delaware near the present site of the Navy Yard. Today one has to go to Washington State to see such a splendid array. A man-made climate change brought it about.

Every perennial is a native plant somewhere. People have carried them around the world for many purposes, medicinal, aesthetic, nutritional, nostalgic. We are often amazed by the "adaptability" of some of them or by the "intractability" of others. Closer examination of these performances will usually reveal, however, that the plant is less adaptable or intractable than we have thought. What they really are doing is telling us that we have planted them in a favorable or unfavorable microclimate.

The key to growing perennials successfully is our ability to match the microclimate of the spot where they are to grow with the macroclimate in which they originated. How well we do this is the essential art of gardening. The opportunities lie just beyond our doorstep, from Greenland to Java, from Siberia to Brazil, in Delaware Valley, U.S.A.



1



2

1. *Campanula persicifolia* in foreground, *Thermopsis caroliniana* in background
2. *Begonia evansiana*
3. Hosta Susy in foreground, hybrids in background between *Lobelia cardinalis* and *L. siphilitica*.
4. *Nierembergia* Purple Robe



3

photos by Bebe Miles



4

winter gardening under polyethylene

As amateur gardeners, more interested in vitamin packed, fresh produce than the intricacies of elaborate horticultural displays, a summer garden behind Jim and Betsy Armour's Main Line home became as routine as mowing the lawn.

When the shadows of autumn fell upon the waning growth, and the last vegetables were harvested, Betsy gazed upon the barren ground with regret. Enveloped by a nagging impatience for winter's hiatus to pass, it was no wonder her interest was sparked when she read about the arts of polyethylene gardening throughout the winter months in the very cold Zone 2. Enthusiasm at a peak, she began construction at once, but like Humpty Dumpty, it all came tumbling down. The project went back into motion when Jim agreed to participate.

Polyethylene structures vary in size and design. They can be large or small, ornate or simple. As unskilled builders, the Armours opted for sturdy simplicity by building one large enough to supply salad garden vegetables and herbs for their family of four.

The 7-ft. high, 13-ft. wide and 10-ft. long structure cost under $25. It was built in three hours over their existing summer garden where optimum conditions prevailed, full sun, good drainage and protection from the wind.

Two 8-ft. 2 x 4's were placed upright, centered 10 ft. apart and dug into 16 in. of soil for support. A 2 x 6 10-ft. ridge pole was then attached to the uprights leaving an abutment at the top to receive the attachments coming from the sides that formed the A frame. It was made by using eight 10-ft. 2 x 4 pieces of lumber, and cutting each end at a 45° angle so the boards would be slanted to fit snugly against the abutment, and to fit against the ground. The skeleton now resembled the roof of a house with four of these pieces spaced evenly on each side.



photos by Corbin D. Riemer

Betsy Armour picks a sprig of dill from her winter garden.

Each upright was then anchored to a piece of 1 x 4 board attached about a foot from the ground and nailed to stakes directly under the 2 x 6 ridge pole. A triangular brace of ¾-in. board was attached at the front and back peaks for additional bracing. The frame was now strong and sturdy.

With all the braces in place, less than two rolls of four mil, translucent polyethylene was fitted over the entire frame. It was trimmed with scissors allowing for 16 in. to be tucked into a

by Jan Riemer

Intrigued with the concept of polyethylene gardening, Jan Riemer shares her research with gardening devotees.

trench of equal depth that surrounded the entire structure, excluding the door entrance. After arranging the polyethylene into the trench it was then covered with soil to keep the tent airtight.

At the entrance of the frame, the overlapping material was left intact and uncut, allowing room to enter the tent comfortably by simply lifting the excess material. When closed, 1½ ft. of polyethylene lay on the ground anchored with a heavy plank. Either side of the opening was reinforced with furring strips until taut and firm.

Furring strips were also placed along the entire length of the A frame's 2 x 4's to prevent the polyethylene from lifting and billowing during strong winds.

After the labor was completed, the fun began. In early October after preparing the soil organically, Betsy made a carpeting of wall to wall plantings that included several kinds of lettuce, spinach, chard, parsley and onions in circular fashion around a small walkway to a center perch where she could tend each plant without tramping upon the lush growth yet to come. Fertilized and watered initially, the chores for the entire season were now completed except to add a grass-clipping mulch after growth began. Unlike summer gardens, weeding took only about an hour during the entire winter.

In principle, polyethylene gardening is the application of solar energy. The polyethylene allows the sun's heat and light to penetrate causing moisture to condense and cover the inside of the tent and to form droplets that slowly and steadily return to the soil. The cycle remains constant and continuous. The plants closest to the edge of the tent grow more robustly than those not receiving the same amount of moisture.

Temperatures within the enclosure generally vary from 45° to 75° depending on outside conditions. Too much condensation and heat within is eliminated by simply opening the flap for a few hours. Blessed with benevolent weather conditions during 1974 and 1975, the Armours harvested prolific hardy crops all season by snipping from the mother plants and strengthening them for continuous supplies. Because of steady sub-zero temperatures during the early part of 1976, small losses occurred with each crop except the oakleaf lettuce that continued to thrive under adverse weather conditions.

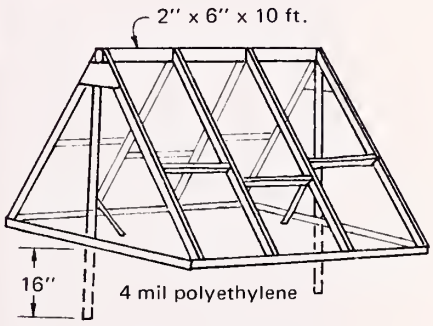
Along with the advantages of simple, low-cost construction, a steady supply of fresh produce all winter, no physical or financial maintenance, an appreciable saving on food costs and an absence of annoying bugs or white flies (so often found in greenhouses) the tent offered still further dividends. The structure prolonged the growth of tender crops in the fall while spring plantings were started in late winter, where they remained in their bed, by removing the plastic that needs replacing each year.

Aesthetically, polyethylene tents may not meet everyone's standards, but standards may soon be dismissed after stepping inside and seeing the benefits of spring through the winter.

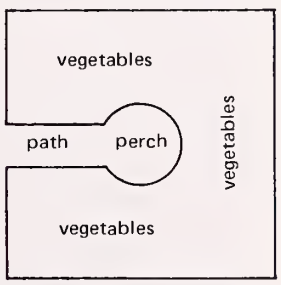
●



The door flap of the tent stays intact all winter. Here it has been removed to let in the springtime sunlight and to let the air circulate within.



View of outside the tent



View of inside the tent

harvest bounty



photos by John Gyer

On the way home from vacation last summer I read an article that made me homesick for our vegetable garden. In the July 28, 1975 *New Yorker* Joseph Wechsberg reviewed experiments with a lighter style of French cooking, a search for the innermost flavors of foods served without camouflage. He wrote about Michel Guérard, a celebrated French chef who seeks out "the freshest vegetables and fruit, full of their own aroma, harvested at the moment of their peak." Heady words for me after weeks of freeze-dried camping menus.

It's rewarding to me as a gardener to observe the current interest in finding the truest flavors. Many of us plant the vegetables we remember eating sun-warmed in Grandmother's garden (my reason for planting yellow plum tomatoes). We try the vegetables our State Experiment Station has developed for disease resistance in the local climate (my reason for loyalty to Ramapo tomatoes). We plant the vegetables our neighbor grows (though here it is my reason for not planting asparagus, which I buy early in the season at my neighbor's farm, cut especially for me on a morning when there has been no rain to splash New Jersey sands into the spears). During 10 years of gardening together, John and I have found several superior varieties of vegetables and fruits for our New Jersey terrain and climate. It takes quite a bit of experimenting. Our raspberry patch has included up to 35 varieties.[1] After testing, we have chosen plants that do well for us and that we like best. Similar experiments are probably taking place for all those new gardens appearing in vacant lots, school grounds, and sometimes in front yards.

Experimenting with vegetable varieties to find the best flavor and quality has a long history in our country. Thomas Jefferson grew more than 30 kinds of vegetables at Monticello. He shared seeds of new species received from abroad, and he kept records of the first and last appearances on the Washington Market of 37 kinds of vegetables. Advice from a gardener who has been keeping records of his favorite varieties for about 50 years is contained in the 1975 Revised Edition of *Burrage on Vegetables*.[2] He proposes trying several varieties, conducting taste tests, and keeping records to observe the changes dependent upon the type of soil, the exposure, the time of harvest.

[1] "The Queen of Fruits" by John F. Gyer, *Green Scene,* January-February 1974.

[2] Available at PHS Library.

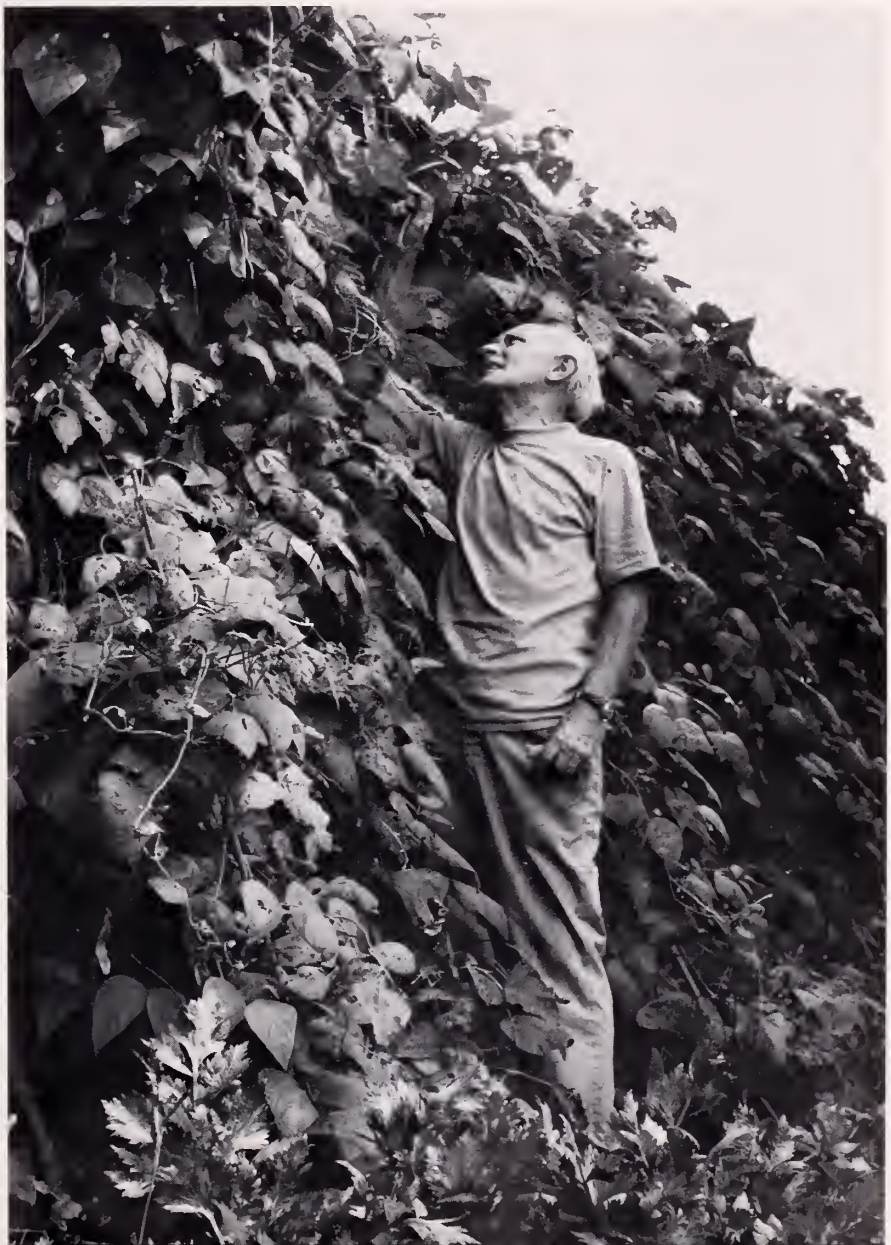
Another of my favorite vegetable gardening books is *Big Crops from Little Gardens,* A. B. Ross, Mintor, Balch & Co., N.Y., 1925.[3] Ross acknowledged the considerable help of W. Atlee Burpee Company of Philadelphia; many of the demonstration garden photos are from Burpee test gardens. Burpee continues to inspire gardeners with their beautiful exhibits of vegetables. Variety names in the book are out of date, but the approach is not. Ross was particularly interested in maintaining food quality. He wrote that each hour's separation from the soil subtracts from the energizing power of food. He felt that a home garden provides a way of eating well. Because food grown in good healthy soil is fresh and wholesome, it helps to maintain health.

The nutritional value of homegrown vegetables also interests PHS member Hannah Bostwick. She attends national and state chapter meetings of the Natural Food Associates, an organization dedicated to furthering soil conservation, increased soil fertility and improved food storage methods to improve nutrition and health. Last summer she lent me her Mountain Valley Dehydrator,[4] a home-sized food drier that maintains foods at 140° during the drying process while a fan circulates air over seven trays. We got the greenest dried parsley ever. I had

continued

[3] Available at PHS Library.

[4] Cache Mfg. & Const., Inc., Logan, Utah.



At right, Bill Hirsch inspects each lima bean before he picks it.

At left, a Gyer Harvest Show Entry

by Janet Oliver Gyer

John and Janet Gyer are enthusiastic gardeners until this time of year when Janet starts dreaming of a killing frost which will allow her in good conscience to turn her back on more harvesting and reap the rewards of the summer's food larder.



Anita Kistler's fine stand of swiss chard is bordered by marigolds.

harvest bounty continued

expected dried apples to be my favorite product, but our bumper crop of peaches gave us the unexpected treat of the year. Dried peaches are superb hiking or car snacks that can be tucked into the glove compartment in a plastic bag. Long-term storage in our humid climate worries me, so I store my dried fruit in airtight containers in refrigerator or freezer.

Hannah solved another production problem for me last summer. For the zucchini crop, she suggested a zucchini bisque, which freezes to perfection. It consists of lightly sautéed onions and zucchini, blended and combined with milk and chicken broth. For freezer tomato soup we use a "Victorio Strainer" from Sears, which juices blanched tomatoes in record time. It is a large version of a food grinder that effectively removes skin and seeds. During the winter, tomato juice is combined with broth to produce a variety of soups. PHS member Jan Hirsch keeps a jar in the freezer for saving every bit of the water that she used for cooking vegetables. Anita Kistler prepares a soup that can be quickly readied for the freezer and quickly defrosted for winter meals for a busy family, carrying fresh and immediate garden flavors over to winter evenings. Zucchini, lightly boiled to the just limp stage, is put in a blender with its cooking water, raw tomatoes and raw onion. Herbs are not necessary, for the garden flavors are complete in themselves. Only salt is added when defrosted. The Kistlers' tomatoes displayed at Harvest Shows attest to the quality of their winter soups.

Some readers may remember the beautiful large beets the Hirsches entered in the 1975 Harvest Show. They noted on the entry card that the Lutz Green Leaf Beets never get woody, regardless of size. They are superior as cooked greens, spring, summer and fall, and they keep well in winter. Because our sandy soil does not provide us with very good root crops, they gave me the beets on closing day. I set out to manufacture a supply of borsch for the freezer. The full preparation was just too much kitchen work at that time of year, but halfway preparation of pressure-cooked and blender-smoothed beets was a good start toward future soups.

One of the vegetables that comes to the table the way it went into the freezer is corn. When I talked with Anita Kistler last summer I found that she had harvested and prepared 200 ears of corn for the freezer. She removes the corn from blanched ears and packages it in plastic bags—large ones for family dinner, small ones for vegetable soup.

Berries do not maintain texture, but if frozen on trays and kept in plastic bags they can be poured out, as needed, for dessert toppings. When I defrost our raspberries, I separate the juice from the berries, cook it down with sugar or honey, and add the warm syrup to the berries just before serving them in patty shells or over other desserts.

Tomatoes are not a freezing problem for me because I use cherry tomatoes. One of our favorite winter dishes is stewed peppers, onions and tomatoes. I pack cherry tomatoes, lightly blanched and skinned, with lightly sautéed peppers and onions. When they are removed from the freezer for serving, a short warming period is all that is required, and the dish holds its color, texture and taste.

Burrage stresses that harvest for storage should be made at the time of peak flavor production. We have all observed the youthful vigor and productiveness of tomatoes early in the season. Those harvested just before frost are surely welcome, but they do not have the sugar content we found when the sun warmed the plants for long periods each day. Since storage space is often limited, it is well to allot a prescribed area for each vegetable based on an estimate of the number of meals to be served until next production. The Burrage family has apparently arrived at a happy balance of preparedness vs. overabundance. I know this goal is not easy to achieve. I am hoping to convince John to plant only enough for our meals, for some

guest dinners, and some gift baskets of vegetables. By canning, freezing and drying it is possible to provide "from our garden" quality all year-round. I do not have storage space for canned food, but for those who do, The Wayne Women's Garden Club display at the 1975 Harvest Show must have inspired action. Their "Canning Cupboard" answered questions about several systems of canning and the equipment required.

The *New Yorker* article relates Chef Guérard's assault on the twin modern enemies of calories and cholesterol. Instead of butter and cream sauces he purées vegetables mixed with herbs. He uses no sugar, except the sugar content of fresh fruit. Jan Hirsch also says she avoids calories and cholesterol by serving the freshest vegetables harvested at the moment of their peak from her own garden. She accents low-fat meals with herbs such as savory, thyme and basil. When fresh herbs are not available she chooses cumin, but good vegetables do not need camouflage. The Dr. Martin Pole Lima Beans, which provide some of the protein for their summer meals, merited a first prize ribbon at the 1975 Harvest Show when she and Bill entered four vegetable classes and received four ribbons.

To avoid losing nutrients Hannah Bostwick uses stainless steel waterless cookers. One of Chef Guérard's prime recommendations is cooking in tightly closed containers. For example, he allows meat or fish in a strainer to steam in the aroma of carrots, watercress, celery roots, and small mushrooms, with no added liquid. Jan Hirsch confirmed her agreement with tightly closed container cooking when she told me that she uses her pressure cooker 6 days out of 7.

I don't use a pressure cooker that often, but for a long time I didn't use it at all. Helen Wright, a retired New Jersey home economics teacher, kept reminding me that lima beans would taste best if lightly cooked in a pressure cooker. Because the cooking vapors are contained, no flavor is lost, and because of the speed no color is lost. My husband grows pole lima beans and understands them, so he has become lima bean chef. He dug out the little pressure cooker we use for high-altitude camping. It has divider baskets and a trivet to raise the baskets above the one-half inch of water necessary for steaming. He cooks small batches for one or two minutes only, then removes the pressure cooker from the heat and allows it to sit for a few minutes before releasing the pressure. He serves the beans with a bit of butter, salt, pepper, and a hint of sugar.

A vegetable, a salad plate, and crunchy bread provide a fine summer meal. Summer entertaining is easy because guests can be lured out to the vegetable garden where they don't balk at picking their own dinner. They don't even object to helping shell beans at cocktail time. I serve the salad plate, and John does the only cookery—the beans.

Advice from a gardener who has been keeping records of his favorite varieties for about 50 years is contained in the 1975 Revised Edition of *Burrage on Vegetables.* He proposes trying several varieties, conducting taste tests, and keeping records to observe the changes dependent upon the type of soil, the exposure, the time of harvest.

My mother likes to use a light touch with vegetables. She cooks them in a small amount of water and serves them as quickly as possible from garden to table. When we lived in the South I remember Mother's forays to rescue our Yankee "English" peas from the fate of simmering for hours.

Another way to keep some of the crunch in vegetables is stir-frying (lightly cooking in a little oil). It has become popular now that woks are available at most kitchenware stores, and has become a way for me to combine pressure cooker and wok. Greens are a fine addition to a stir-fried vegetable dish, but invariably the first cooked are discolored by the time the last are ready for the table. Quick pressure-cooking will reduce a pot of greens to the point where they can be placed on a board, cut to bite size, and then added to the wok for a last-minute stir with the other vegetables. Swiss chard is a candidate for stir-fry, providing greens well into the winter. The pictured crop of Swiss chard in the Kistler's garden provides three dishes for their family. Anita prepares the stems in the same fashion as braised celery, and serves the leaves as salad or cooked greens.

We raise shallots especially for their light flavor in stir-fried dishes, and we particularly like a combination of sweet peppers, okra and shallots. We were given the idea by a friend who just happened to have those vegetables on hand one day and found that they compliment each other. Nearly every home gardener raises zucchini, green onions and cherry tomatoes. The combination of finger-sized zucchini, sliced with onions and cherry tomato halves provides a marvelous stir-fried vegetable dish. Basil is good in this combination, but if it is not available, a bit of powdered ginger does wonders for zucchini.

One last bit of advice from Chef Guérard. He likes to use very large plates and arrange an artful still life of the diners' portions of food. If we cultivate a like regard for the best of the garden, there is no doubt that we can enjoy the best of the table.

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Look for the Gyers' entry at the Harvest Show at Memorial Hall in Fairmount Park on Saturday and Sunday, September 25 and 26. Members' Preview 3 pm to 6 pm on Friday, September 24.



Banana peppers and marigolds edge Hannah Bostwick's garden.



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photos by Edmund B. Gilchrist, Jr.



3

propagating and displaying FERNS

Almost a year ago, I described some techniques that I have used to successfully raise attractive and healthy ferns (*Green Scene,* Nov. '75). Although cultivating and maintaining these plants successfully can be a satisfying activity in itself, it is by no means the final goal. As most gardeners discover, especially those whose passion for plants has gotten the best of them, it is not enough merely to raise fine specimens. One is soon seized by the inescapable urge to propagate one's favorites. Many people who are adept at propagating flowering plants become uncertain about propagating ferns. How can one propagate a plant without seeds, or without taking cuttings, they ask? Many experienced gardeners do not even try to increase their fern favorites, because the techniques seem to be shrouded in mystery.

Really there is nothing mysterious or even difficult about propagating ferns, and most methods of propagating flowering plants can be used to increase your fern collection. You have to learn which ferns can be propagated in what ways.

As every gardener knows, there are two basic ways to propagate plants, sexually and asexually or vegetatively. These two methods occur in nature as well as through our efforts.

PROPAGATING FERNS

sexual propagation

Sexual propagation is the union of male and female reproductive cells or gametes to produce a new individual or zygote. The male gamete, sperm, fertilizes the female gamete, egg. A new plant develops from the union, called fertilization. In flowering plants the new offspring does not develop immediately into a new plant. but the zygote remains dormant, encased in its seed, until environmental conditions permit its germination. When we sow seeds, we provide the appropriate environmental conditions required for germination to occur.

Although most ferns also reproduce sexually in nature, their life cycles differ somewhat from the life cycles of flowering plants. When fertilization takes place on the fern prothallus, no dormant period occurs and no seed develops. The zygote immediately begins to develop into a new plant. On the fronds of the mature fern spores develop within sporangia which, when released, must find a suitable substrate on which to germinate, and conducive environmental conditions for growth. When we sow fern spores, we help the fern to reproduce sexually, just as we help flowering plants, when we sow seeds.

Although unnecessary for most seeds, sowing spores requires conditions as nearly sterile as possible since fungi or other organisms can attack the spores. Because spores must have 100% humidity to germinate successfully, I find a closed plastic or glass container, which retains the most moisture, works best. However, a clay or plastic pot, plastic refrigerator dish or even a petri dish will be fine. Any soil-based or soilless medium described in my previous article can be used; milled sphagnum is



4

1. Spores are scattered on the potting medium.
2. Prothallus sporophyte emerges.
3. The sporophyte's initial frond looks different from the mature fronds. Note the curled crozier at the base of the prothallus.
4. A small viviparous plantlet on a mature frond of *Asplenium viviparum*.
5. *Hemionitis palmata* produces viviparous plantlets on the lower surface of its fronds.



5

by Stuart Simon

Stuart Simon is a doctoral candidate in educational administration at Temple University. He has spent the past year in Germany comparing public service programs in botanical gardens and arboreta with those in America.

also a good choice.

If you use a glass container, such as a petri dish, place the moist medium in the container and sterilize the medium and container in the oven at 250°F. for one hour. After removing the container from the oven, allow the medium to cool to room temperature. If too much moisture has evaporated from the medium during the sterilizing process, restore the moisture by pouring boiled water over the medium. The medium should be moist but not soggy. If you are using a plastic container, soak the container in a 10% chlorox solution and sterilize the medium separately. After the container is prepared, sprinkle the spores on top of the medium (illus. 1) and cover the container with the top, if using a container with a lid or with a piece of sterilized glass. Place the container in filtered light or, better yet, under fluorescent light. Since spores of different species germinate at different rates, you may wait from only a few days to a year. Some species require great patience!

After the spores have germinated and the tiny prothalli (see illus. 2 and 3) have developed, open the container and carefully sprinkle water on the prothalli to ensure fertilization. The sperm must swim to the egg in a thin film of water. After the sporophytes have developed, you can successively transplant ¾-in. plugs of sporophytes until each individual fern has been transplanted. Since most fern spores are sown too thickly, masses of tightly crowded sporophytes are inevitable.

vegetative propagation

The term "vegetative propagation" refers to the asexual process by which plants can reproduce without fertilization. The process occurs naturally, as well as through cultivation. When we make cuttings of our favorite plants or divide clumps that have gotten too large, we are propagating plants vegetatively. Ferns can also be vegetatively propagated with techniques similar to those we use for our flowering plants.

viviparous ferns

Anyone who has grown certain species of kalanchoe is aware that these plants develop tiny offspring or plantlets on the edges of their mature leaves. Such plants are known as viviparous (*vivus* alive and *parere* to produce); in other words, the plant is produced asexually, or live and does not require fertilization. Certain ferns can also reproduce by viviparous means: *Asplenium viviparum* (illus. 4) and *A. bubliferum* and various species of hemionitis, such as *H. arifolia* and *H. palmata* (illus. 5), produce similar plantlets. Some ferns, such as *Tectaria gemmifera,* produce small bulblets on the upper surface of their fronds which either develop into plantlets on the frond itself or do so after dropping to the ground.

In order to propagate these plantlets remove them carefully from the frond of the parent plant and place them firmly on top of a typical propagating medium such as moist vermiculite or perlite. If the frond can be removed without detracting from the appearance of the fern, section the part of the frond with the plantlets and place on the medium. Cover the container with a transparent top to increase humidity.

continued

6. A sharp knife and sure hand divide a crowded pot of maiden hair *(Adiantum sp.)* fern.
7. After division, treat the separate halves of the fern as individual plants.
8. A small piece of rhizome with a frond attached is severed from the davallia.



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FERNS continued

With the container placed in a well-lit spot or under fluoresent lights, roots will develop and the plantlets will increase in size. After good root development has been observed, you may transplant the plantlets, but place the containers in a plastic shoebox or some other container for maximum humidity until the plants are well established. Be sure that the medium is moist at all times, but not soggy.

offsets

Offsets or pups are similar to viviparous plantlets to the extent that they are small plantlets produced asexually by the parent plant. However, instead of being produced on aboveground parts of the plant, offsets are produced from the underground rootstock. Anyone who raises bromeliads knows that offsets are frequently produced from the rootstock of the plant after it flowers. When removed and potted, these young pups develop into mature plants.

Some ferns of the genus platycerium can also produce offsets from their rhizomes. Platycerium offsets are produced between the shield fronds and may be carefully removed when large enough to be handled efficiently. When placed on top of a potting medium in a closed container, these offsets produce new roots and, with proper care, develop into mature plants.

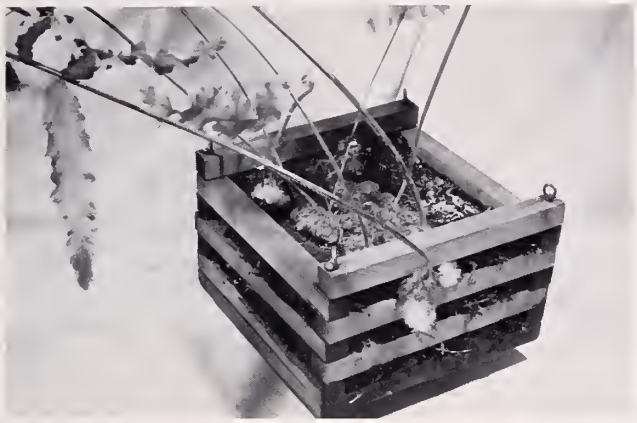
division

Like many species of flowering plants, numerous species of ferns develop from crowns that often become multiple in mature specimens. When ferns develop multiple crowns, the individual crowns may be separated from each other and potted separately to develop into individual plants. To divide a healthy fern with two or more crowns simply remove the plant from its pot, take a clean, sharp knife and all your courage, and cut cleanly between the crowns and through the root system until the plants are completely separated (illus. 6). The root system should be divided so that each crown retains its equal share of roots (illus. 7). Pot each plant in its own roomy pot and place in a plastic bag for at least a month to permit it to recover from the operation. I have successfully used such a technique on the bird's nest fern *(Asplenium nidus),* the hart's tongue fern *(Phyllitis scolopendrium)* and a miniature tree fern, *Blechnum gibbum.*

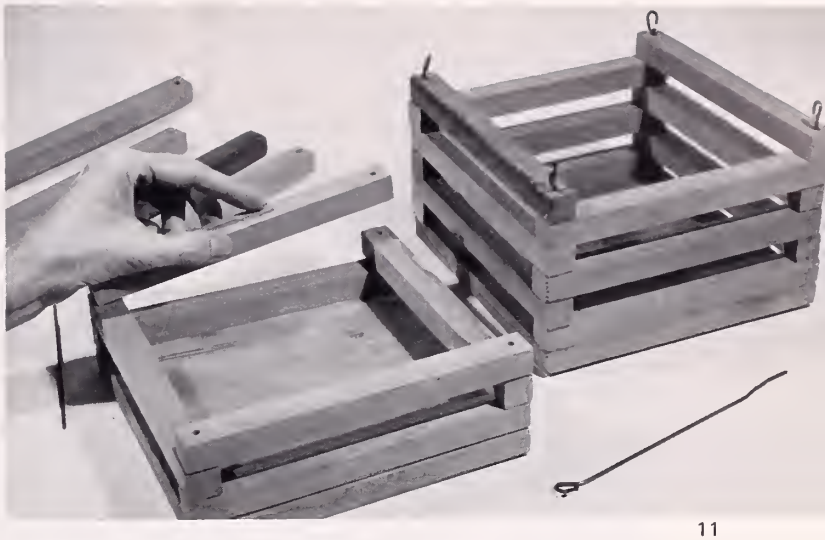
Even ferns that do not form crowns can be divided when they become too large for their allotted space or when you wish to increase your collection. Ferns that produce ever-expanding mats of rhizomes and foliage, such as maidenhair ferns (adiantum) can be divided in the same way as crown-forming ferns. Simply remove the fern from the pot and cut through the foliage, rhizomes and roots until the original plant is cut in half. Then proceed as described above. The best time to divide both types of ferns is just as they are coming out of dormancy and starting into new growth. Of course, the tropical ferns in your home or greenhouse may not display any signs of dormancy, in which case division at any time should produce successful results.



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9. After separation from the parent plant the rhizome cutting is placed in a container of vermiculite and fastened with hairpins. The container is then placed in a plastic bag for humidity.
10. A perfect home for *Polypodium aureum mandaianum*.
11. It's easy to assemble your own redwood basket from raw materials.

rhizome cuttings

Probably the most common method of vegetatively propagating flowering plants is stem cuttings. Even the most inexperienced gardener has at one time or another placed a stem cutting into a glass of water or into a container of vermiculite. Although we cannot propagate ferns exactly the same way, we can use similar techniques.

If we recall that a fern rhizome is really a modified stem, it will come as no surprise that ferns producing aboveground creeping rhizomes, such as davallia, polypodium and aglaomorpha, can be propagated by making cuttings of their rhizomes. There are two alternative techniques that can be used. First, a 2-in. or more rhizome tip is tacked down to the potting medium with hairpins. This is done while the length of rhizome is still attached to the plant. After roots form under the rhizome, sever it from the parent plant with a sharp instrument (illus. 8) and place the rhizome on top of the growing medium in a separate container, carefully covering the roots. Since the rhizome will be wobbly, attach it firmly to the medium with hairpins, or bent wire (illus. 9). The whole container should then be placed in a terrarium or plastic bag for the required humidity.

An alternative technique, especially useful for cuttings from friends' ferns, is to sever a tip cutting (2 in. or more) from a rhizome without waiting for root formation and proceed as in the previous method. Although growth will be considerably faster when the cutting is rooted before severing it from the parent plant, I have used both methods successfully.

With both methods, cuttings can be made with or without attached fronds. I have had success both ways, but find that development is faster and surer when a mature frond or two is attached to the rhizome cutting. This is especially true for varieties of ferns with slender rhizomes.

DISPLAYING FERNS

Perhaps the epiphytic ferns, with their creeping rhizomes, are the most dramatic when imaginatively potted. A most interesting container for use with the coarser epiphytic ferns, such as *Polypodium aureum mandaianum,* is a rugged looking slatted basket made of redwood (illus. 10). The slats permit the rhizomes to grow through the potting medium and out the space between the slats. They create quite a dramatic effect in a mature specimen and the redwood seems impervious to drenchings. The potting medium shouldn't dry out; dunk the basket in tepid water whenever the medium shows a hint of dryness. That might be every other day or even daily in the winter. According to fern specialist H. Gordon Foster, the container can be assembled from twelve ¾ in. x ¾ in. x 8 in. slats of redwood and a ¾ in. x 8 in. x 8 in. base (illus. 11). Four heavy copper or aluminum wires, with loops bent in one end, are threaded through the holes and bent into an angle under the base. Hanging chains are fastened to the loops. The basket is lined with long fibered or sheet sphagnum before being

continued

12. A rot-resistant cedar plaque, to which a wire net has been attached, lined with sphagnum moss and filled with potting medium.
13. A completed cedar plaque attractively displays a large staghorn fern.



12



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filled with potting mix and planted.

For the more delicate and lacy ferns, such as *Davallia fejeenis plumosa,* one can use a shallow dish of subtle design, made from a variety of materials. The dish may be suspended against a window to permit the slender silvery-white rhizomes to encircle the container. Since epiphytic ferns require less potting mix than their terrestrial cousins, a shallow container, with a drainage hole, of course, is ideal. Instead of suspending the container it may also be displayed on a low pedestal on the dining room table, making a perfect centerpiece for a dinner party.

Of particular interest to terrarium designers is the use of smaller epiphytic ferns such as *Polypodium piloselloides,* with its half-inch wide fronds, or young plants of *P. virginianum* or *P. polypodiodes* with their somewhat larger fronds. These ferns may be displayed effectively on small tufa or feather rocks in the terrarium, where their slender rhizomes can creep over the rock. Holes are chisled in the top or sides of the rock and the holes filled with potting medium. The roots of the ferns are firmed into the medium with the rhizomes resting on the surface.

A final way to display epiphytic ferns, particularly the fast growers of the davallia or rumohra genera, is to use containers of varying shapes made of fibrous tree fern material. A fern is placed in a hole in the container and the rhizomes are permitted to clamber all over the tree fern. A tree fern monkey crowned with a large *Rumohra adiantiformis* is a particularly amusing sight.

A practical, as well as attractive way of displaying staghorn ferns is to mount them on redwood or cedar plaques. Since these ferns tend to outgrow such slabs, an efficient way to mount them is as follows: Cut a mounting board of 1 in. thick, rough redwood or cedar into an 8 in. x 12 in. or 12 in. x 12 in. size (illus. 12). Cut a 14 x 15 or 18 x 15 piece of chicken wire, and starting about 1 in. down from the top of the board, nail the wire to both sides with galvanized staples. Fold the bottom corners into a rounded shape and fasten wire to the bottom edge of board, forming a half basket. With wire cutters cut a circular central opening 1/3 of the way from the bottom and just large enough to admit the root ball of the fern. Starting at the bottom, line the wire with sphagnum and fill it with potting mix. Place the root ball in the opening and continue filling the basket with the sphagnum and planting mix. Secure the fern by wrapping floral tape gently, but firmly, around the shield fronds and plaque. Add a hook to the top edge of the plaque and hang the plant in the spot you have chosen (illus. 13). Each time the fern threatens to envelop the plaque, simply cut the wire around the bottom and side of the plaque, carefully remove the wire with the fern intact, and attach the wire and fern to a larger slab.

Such examples show that the rich variety of unusual ferns available to us can be effectively displayed in a variety of exciting ways.

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lawn care now

Now, during the first two weeks of September, is the best time of year in this area to improve and revitalize your lawn. Although most lawn owners have a surge of zeal in the spring, I have always felt that if we could bottle up that urge and release it about now, all the lawns of the Delaware Valley would be magnificent.

Where should you start? Fertilizing, mowing, seeding, weed control, thatching, liming, grub control, sodding—all these terms are familiar and all of them have special significance in late summer and early fall. In fact, the best time to fertilize, seed, lime and to control broadleaf weeds, thatch and grubs is during the early weeks of September. You can begin your lawn management following the steps I have outlined here:

Fertilizing is the most important of all practices. You can't have an outstanding lawn without reasonably fertile soil and there's no point in controlling weeds and grubs, seeding, or thatching a low fertility lawn. These activities won't work as you expect without a soil fertilized to produce good vigorous grass growth. Your best bet is to buy a soil test mailing kit from your county agricultural agent's office ($3.00; see end of this article for address). The sample is tested at the soil testing laboratory of State University. Their personnel will provide you with a three- to five-year lime and fertilizer program to fit your particular soil conditions. If

continued

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photos by James J. McKeehan



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(1) Turf thatch is shown above the knife point and between the brown blades of grass.

(2) Quality lawn contrasted with (3) poor quality lawn.

by James J. McKeehen

James J. McKeehen is the Delaware County Agricultural Agent of the Cooperative Extension Service of The Pennsylvania State University. Twenty-four years' experience with educational turf and horticultural programs for home gardeners and commercial horticulturists provides a background of practical lawn care information.

lawn care now continued

for some reason you can't test your soil and can use an educated guess, apply about 20-25 lbs. per 1,000 sq. ft. of a 10-6-4 lawn or turf grade fertilizer, or its equivalent. It's almost a proper fertilizer recommendation for your lawn; but being a guess, I am not sure how exact it is for your needs; soil testing results will be more precise. Apply the fertilizer now. Don't, however, spread fertilizer on wet grass or you will burn it. Be sure to calibrate your spreader and overlap your wheel marks just enough so you don't create streaks of fertilized and unfertilized lawn.

Clean your spreader with a hose and let it dry in the sun, then oil and grease for winter storage. Fertilizer remaining in your spreader while it is stored corrodes. After fertilizing, your lawn will respond in a matter of days with more vigorous growth and deep green color. You will need rain or irrigation to get the fertilizer working.

Limestone usage goes hand in hand with your fertilizer program. Ground or pulverized agricultural limestone is used to sweeten acid soil; i.e., raise the pH from an acid level to near neutral. Sweetening or neutralizing normally acid soils by spreading limestone on the lawn makes soil conditions more favorable for good grass growth. Fertilizer is more readily picked up by the lawn roots on a well-limed soil. Limestone also provides calcium and magnesium, needed plant nutrients. Apply limestone uniformly over your lawn with a spreader. Don't guess the amount. The only way anyone can tell the proper quantity to apply is by a soil test. The best time of year to spread limestone is now through October. Don't apply limestone and fertilizer together—separate the applications by two or three weeks.

Seeding weak thin areas on a lawn is the best way to thicken the grass stand. The best time to seed a lawn in this area is between mid-August and mid-September. That is true whether you are repairing a thin area or starting a new lawn. It is the time of year to seed with your permanent grass seeds such as Kentucky bluegrass in sunny areas, red fescue in shady areas or a mixture in partially shaded situations. Some of the best varieties of Kentucky bluegrass are Pennstar, Fylking, Baron, Bonnieblue, Adelphi, Arista, Majestic, Glade, Sydsport, Plush, Vantage, Victa, Galaxy, Georgetown, Touchdown or Brunswick. Mix at least three or more varieties together in equal parts for best results. Use 2½ to 3 lbs. per 1,000 sq. ft. for new seedings, less for overseeding thin areas. Some of the best varieties of red fescue are Pennlawn, Jamestown and Highlight. Use 4 to 4½ lbs. per 1,000 sq. ft. for new seedings, less for overseeding. When seeding thin weak areas, rake soil about one inch deep with a stiff garden rake before overseeding. Cover seed ¼ in. and firm seeded area lightly. Fertilize your whole lawn **before** repairing thin weak areas; when you rake you will mix the fertilizer into the seed bed to produce vigorous new growth.

Broadleaf weed control is safer now than next spring. You can spot spray your dandelions, plantains and viny type weeds during September, October and November. Use a mixture of 2,4-D and Dicamba. Read the label before you spray and don't spray under trees. Since your ornamental plants are beginning to go dormant you stand less chance of harming them with weed killers in the fall than you do in the spring when they are in active new growth. Spot treat weeds using the recommended chemicals in a sprayer. Treat only the weeds, not the entire lawn. Usually two to three treatments spaced throughout the fall will work out best. You will be surprised how few broadleaf and viny weeds you will have next spring if you follow this suggestion.

Thatch is a tightly intermingled layer of partially decomposed leaves, stems and roots of grasses that develop beneath the actively growing green blades of grass at the soil surface. Thatch decreases the vigor of your lawn by restricting the movement of water, air, fertilizer, lime and pesticides into the soil. Reduce thatch when it exceeds ½ in. in thickness. Details of thatch control can be obtained from your county agricultural agent's office (see list at end of this article). The usual practice is to rent a thatching machine to mechanically reduce the thatch accumulation. Thatching should be done only when the lawn is growing actively and this practice is often followed by fertilization and overseeding.

Grub control chemical applications must be made in August or early September when the grubs are still small and near the surface of the soil. If you had numerous Japanese beetles during the summer you can expect grub damage to your lawn. Grubs eat away the root system of your lawn, causing dead brown areas. Grub-damaged turf lifts easily due to lack of roots. Chemicals recommended are Diazinon or Dylox. Check your lawn now; timing is critical.

Mowing and sodding are important fall lawn practices. Mowing should continue until the lawn ceases to grow. Your lawn should be cut between 1½-2 in. to get through the winter. In any case, your lawn mower should be set to cut at that height always.

Sodding to repair poor areas or sodding an entire lawn can be done throughout September and October. Select sod type based on the grass seed recommendations mentioned earlier.

Don't let all of these suggestions throw you. Four of the major lawn improvement practices can all be done on one weekend on the average lawn if you're organized. The fifth can be done later.

- Check for grubs and thatch and if needed, control immediately.
- Fertilize in early September right after grub and thatch control.
- Rake and seed thin areas.
- Liming and weed control can go until late September or October.

Now when you step back to admire your revitalized lawn, don't look at it too long or the mowing will get ahead of you!

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YOUR COUNTY EXTENSION SERVICE

As Agent McKeehan has explained, your County Extension Service can supply detailed information about thatching. In addition your agent can answer questions about flower and vegetable gardening, soil testing, liming and fertilizing, insect and disease identification and control, home fruit management, planting and care of shrubs and trees and safe use of pesticides as well as many other subjects. Just for the asking you can have copies of State university publications about agriculture and horticulture through Extension Service Offices.

The county agent is an expert with technical training and experience in the conditions and problems in your area. The agent's job is to answer your questions and give helpful advice. When s/he is stumped, s/he can call upon a corps of specialists at the State university.

Listed below are the names of county agents in the areas of our subscribers:

EXTENSION SERVICE AGENTS

	COUNTY	AGENT	ADDRESS	PHONE
PENNSYLVANIA	Bucks	Richard A. Bailey	Neshaminy Manor Center Doylestown, PA 18901	215-DI 3-2800
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creative containers

From the earth come plants, clays and metals that the creative mind can shape into objects of art. Members of my family, the Salters, work with a wide variety of these substances every day on the ground floor rooms of our old colonial farmhouse. Mark Salter, my father, makes original topiaries, terrariums and furniture. The pottery is made by Jean Salter, my mother, my brother Tim and myself. When we need inspiration, our greenhouse serves as a stimulus and a place to get together. We enjoy what we are doing and assist one another willingly, even if it's only helping to carry a 25-pound bag of clay or deciding whether terra cotta, grey, brown or black clay best accents a plant. Cooperation exemplifies what we are trying to achieve in our work: harmony between the art of nature and our craft.

In the beginning, coming up with ideas was the hardest part. We found, however, that familiarity with plants provided an unlimited source of inspiration. It is surprising what a plant will suggest when you look closely: a design, a form or a color. Making containers for specific kinds of plants is challenging. Usually a plant that cascades like the spider plant or episcia tends to dominate a pot. A container that is long and cylindrical gives contrast to foliage and allows its design to show. Another variation is the rectangular



photos supplied by the author

Critter pots

Sandra Salter Ollis is a professional potter who studied education and art at West Chester State College. A lifelong interest in plants has led toward her horticulturally-oriented craft.

by Sandra Salter Ollis

container to be used when there is no room or facilities for hanging a pot. The pot is made tall so that the plant can drape gracefully over the sides. A gay baby geranium in a tall rectangular container can be set on a sunny windowsill. The hairy rhizomes of the squirrel foot, bears paw and rabbit foot ferns are hidden when the plant is hung, so we created a woven clay basket to show them off. The rhizomes freely protrude through the lattice creating an interesting textural design. The basket can also be used to display plants for an overall effect. We have planted sagina, a low grassy alpine, in the open latticework and a fern on the top.

The succulent and cactus family inspired a series of designs. At first these plants were used to represent a Mexican or desert scene in a garden form. Then we found some large and beautiful specimens that were unique when planted alone. Keeping in mind the plants' natural growing area and the creatures that find shelter among them, we created what we call "critter pots." Realistic and stylized horntoads, lizards and scorpions are a few of the critters sculpted on the containers.

Not every container is designed or inspired by a particular plant. We have many containers that are unique creations. Two very bold and dramatic pieces are a Viking ship and a Mayan head. Each is made to resemble originals. Other containers display a more delicate touch, e.g., the grape cluster, which is a hanging cluster of grapes that can be planted, and the fruited pots, with a band of fruit. Both are classical designs.

Sometimes an idea stems from a typical piece of commercial pottery. We call our strawberry jars "pocket jars." These range in style from hanging to sitting, and in size from small to large. Some pockets are thrown on the pottery wheel and later joined to a large central pot to form a design we

continued



Critter pot for specimen cactus





Viking ship planter



Grey strawberry decorated container planted with miniature moss rose



Large decorative container



Watergarden with sitting and leaping frogs

have dubbed the "alababa jar." These unique jars have a center container with three pockets that are attached by short clay supporting arms. Some of our other pocket jars have hand-built pockets. The pocket is significant because it allows more room for soil to surround the roots. The pockets also can be watered individually, although there is an opening connecting the main pot for growth and general watering. The relationship between the plant in the main jar and the side pockets is appealing. The proximity of the pockets allows the plants to form line and color, the art of nature.

Jean Salter's fascination with water and its reflections led her to experiment with the suitability of a bog or watergarden for a small garden. We selected plants that would survive the chlorine in household water. Also we had to find plants with limited growth habits so that they would not outgrow their containers. The hardiest plants, acorus, umbrella palm, papyrus, salvinia, azolla, and miniature water lilies are a few that we used. But, algae presented a further problem. We found that a commercial chemical, fresh-water clams, snails, and oxygen plants keep algae down. Eventually, with clay ornaments in a clay bowl, we achieved a pond effect to make a decorative piece.

Among small garden planters, trough gardens have also been popular. We've made troughs of clay, wood, or a cement mixture, formed to desired size and shape. We've found small oval troughs of clay to be best for cactus and handmade redwood boxes best suited for more formal gardens. We use a mixture of peat, perlite and cement in equal portions for hardy succulents and alpines because it can endure severe weather and it has a rough stone texture.

For seven years, my parents have been doing original topiaries. The very first were small owl frames. These led

ultimately to such large pieces as a full size mountain goat. Jean begins the design process with a flat drawing. Mark transforms these drawings into three-dimensional wire forms, which are spot-welded. Most topiaries are stuffed with sphagnum moss, which serves as the planting medium, but we fill the centers of ours with soil, which makes for much easier care. First, we line the inside of the frame with sheet moss. The soil is then funneled into the cavity. The finished topiary lasts longer because the plants covering the form are surrounded by soil. The forms range from the standards, which are flat, to three-dimensional animal forms. Among our most popular animal forms are beavers, ducks, poodles, cats, rabbits, and turtles.

During the past two years, Mark began to work with terrariums. An original design, the terrariums are leaded glass with a copper pan and copper top. In 1975 this design placed first in the Philadelphia Flower Show. Those terrariums that are large enough have a tiny pool for water and plants. Often we use small clay birds, either in flight or standing.

In addition to pots that are utilitarian, we've made purely decorative wall containers, with either representational or freeform designs. The first kind is the wall plaque, decorated with wildflower or woodland plant designs. These have a small pocket at the bottom for planting. Contemporary designs accent the beauty of foliage and color of staghorn fern and cryptanthus. Another wall container is a thrown pot with a clay loop on the back for hanging against a wall, and distinctive designs on the front. One of the most popular designs is mushrooms, a combination of shelf fungi, morels, mushrooms and salamanders. A recirculating water system can be designed into the panels with pockets for plants; the water provides humidity and a pleasant

continued



Prize-winning leaded terrarium



Bird drip fountain and wall plaques.



Decorative sunflower plaque



Decorative wall plaque St. Fiacre is the patron saint of gardeners. The pocket below is planted with polypody ferns.

splashing sound. The decorative panels can be used in areas where plants ordinarily do not grow well.

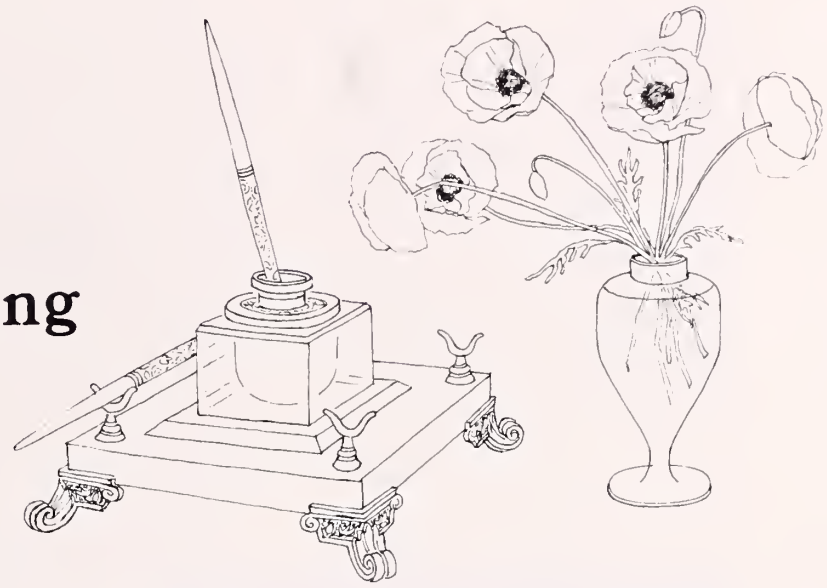
It's only recently that we've extended our interest in design into the decorative area. Our bird drip fountain is not only decorative but it is useful. It is designed as an out-of-doors water container that slowly drips water into a shallow pool. Used indoors, the bird drip fountain provides humidity. The jar has a cylindrical shape and comes in a variety of sizes and decorative designs. Since they are bird drip fountains, we usually have small clay wrens or chickadees perched on a branch on the front of the cylinder. But we have also developed a woodland motif, with fern fiddles or lady slippers using turtles, frogs and snails. These beautiful jars are a charming garden accent or an accent for an intimate plant area.

Our newest way of incorporating horticultural designs and clay panels is in furniture. The first two pieces that our family produced were dry sinks. One is an old country hutch refinished in antique grey with clay door panels formed into a grey grape motif. The second piece is a small pine dry sink that my father constructed. This piece is finished with a walnut stain with terra cotta thistle door panels of clay, clay knobs and a small oval decorative thistle panel above the dry sink pan. We plan to continue making dry sinks for displaying plants and in the future will incorporate a strawberry design motif.

We want to continue to work as a family, each developing our individual skills. At present, we are making functional oval sundials with vines and animals, wooden garden benches with verses by Henry David Thoreau, and a clay snake as a garden accent. We may become exhausted but we will never be bored.

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Writers on Gardening



by Julie Morris

Author Maurice Hewlett has written, "Horticulture is, next to music, the most sensitive of the fine arts." Hewlett's comment about horticulture and the following statement from May Sarton's *Plant Dreaming Deep* made me wonder how other authors view gardening aside from its practical aspects.

Sarton writes, "Is there a joy except gardening that asks so much, and gives so much? I know of no other except, perhaps, the writing of a poem. They are much alike even in the amount of waste that has to be accepted for the sake of the rare, chancy joy when all goes well. And they are both alike in that both are passions that bring renewal with them." Poet and novelist May Sarton gives us in full her own reasons for gardening in her book *Plant Dreaming Deep,* which was written about the years she spent living, writing and gardening in a small New Hampshire village.

While most of the writers don't specifically say what gardening means to them, what I did find was infectious enthusiasm and a great desire for sharing information and experience with their readers. Their feelings about gardening are reflected in the style and content of what they write.

My favorite garden authors are those who wrote during the early years of this century: Gertrude Jekyll, Louise Beebe Wilder and Reginald Farrer. These writers, among others, produced not only useful information but literature. Their books increase in value each year as their status as classics grows.

With some exceptions, most modern garden writers are very matter-of-fact and have little in common with the generous style and intense feeling shown by the authors in the books I want to discuss. The authors under consideration here loved their gardens, grew the plants they wrote about and shared their knowledge with encouragement and humor and without condescension. For example, British writer Vita Sackville-West, who gardened in a far more expensive manor than most of her readers could afford, once stated, "My liking for gardens to be lavish is an inherent part of my garden philosophy. I like generosity wherever I find it, whether in gardens or elsewhere. I hate to see things scrimp and scrubby." However, realizing that many of her readers gardened on a much smaller scale she wrote many columns filled with imaginative ideas for small gardens.

Vita Sackville-West's *Garden Book* is a compilation of her best columns written between 1947 and 1961, a year before her death. Such was the clamor for more of her writing that these columns were published in the *Garden Book* more than 20 years after her first column and six years after her death. Sackville-West's style included chiding and teasing her readers. Never tedious, she covered all phases of her gardening experience: the one-color garden, her disasters or the autumn garden.

"The autumn garden . . . It has its beauty; especially perhaps, a garden with an old orchard attached to it. When I was very small, about four years old, I suppose, a line of poetry entered into my consciousness, never to leave it again: *Rye pappels drop about my head.* I had no idea what rye pappels might be, but they held a magic, an enchantment for me, and when in later life I identified them as the ripe apples of Andrew Marvell's poem they had lost nothing of their enchantment in the process of growing up."

The great gardens she and Harold Nicolson created at Sissinghurst Castle, her home for over 30 years, may be visited today.

A contemporary and compatriot of Sackville-West's, the great gardener and writer Gertrude Jekyll, is a favorite with many of our readers. I found that several of the writers in the collection assembled for this article refer to Jekyll with affection and admiration. She takes us through her gardening years and we delight in a new garden she had made for primroses, or perhaps iris. We share in her new house, her woodland and learn how important fountains and pools are in the garden scheme. Her titles are numerous, though the books themselves are becoming scarce, treasures for the collector.

"I have often thought what a beautiful bit of summer gardening one could do, mainly planted with things usually grown in the kitchen garden only, and filling up spaces with quickly-grown flowering plants. For climbers there would be Gourds and Marrows and Runner Beans; for splendor of port and beauty of foliage, Globe Artichokes and Sea-kale, one of the grandest of blue-leaved plants." Such is Jekyll's advice to those gardening for short tenancies in her book *Home and Garden.* Most of our writers discuss, at some time or another, plant names.

continued

Few are as charming as Jekyll. "Nobody now says Gilliflower, though it is a much better name than the vague Carnation; and the pretty Eglantine, though the sound of it is still known, is put away in the lumber-room of things not used or wanted. . . And as for all that rollicking company of Bobbing Joan and Blooming Sally and Bouncing Bet, they have long been lost, reappearing only in the more dull and decorous guise of Wild Arum and French Willow and Soapwort."

Another Englishman, Jason Hill, explores in *The Curious Gardener* the less frequented by-ways of gardening. His chapter on antique flowers will entice the researcher. Here again we meet some of Jekyll's friends. "I must own to keeping the untidy double Soapwort for no better reason than because I heard it called 'Bouncing Bet' and 'Goodbye to Summer,' and it seemed a pity that such good names should be quite forgotten."

In *In a Yorkshire Garden,* Reginald Farrer shows an indomitable spirit. Having spent many hours searching for blue anemones he leads us on in suspense to his find. "For there, rambling round a little tree, was a colony of wood-Anemones bluer than any Anemone I have ever yet seen in my life. . . Blue, blue, blue, melting, coerulean, altogether exquisite and desirable. Of these, hardly daring to take breath, I leisurely took toll, selecting here and there a piece, and duly respecting the rest."

Another classic, *Color in My Garden,* by Louise Beebe Wilder, is for people planning color schemes. Written in 1918 its ideas haven't faded over the years. Wilder writes with a grace and feeling that cools the reader whose attempts at garden design may at times become feverish. "Some day I should like to plant a garden to the night, to be frequented only at dim twilights, by moonlight, or when there is no light save the faint luminousness of white flowers. There should be sombre evergreens for mystery, an ever-playing fountain to break the tenseness, a pool for the moon's quaint artistry, and a seat."

The books of the great English plantsman E. A. Bowles, long out-of-print, have been reprinted recently. *My Garden in Autumn and Winter* refers to the joys of gardening when he notes the passing of summer with the gardener's eternal optimism. "One of the greatest virtues of gardening is this perpetual renewal of youth and Spring, of promise of flower and fruit that can always be read in the open book of the Garden, by those with an eye to see, and a mind to understand. . . What hopes of future beauty one can read in the fat, nut-shaped bud of a *Pinguicula grandiflora,* the mealy winter rosette of *Primula cashmiriana,* or the hard central crown of tightly rolled fronds of some good fern."

An American, Anna Gilman Hill, tells her story in *Forty Years of Gardening.* Her garden is at Niederhurst on the Hudson. It is a personal story with many practical chapters as well as glimpses into the lives of the people who made the garden. Her references to garden books should help researchers involved in restoration of turn-of-the-century gardens. Anyone who has ever made a garden will appreciate this book. "Thank goodness this is an orderly law-abiding world as far as plant life goes. Would that the actions of mankind were as dependable."

"blue, blue, blue melting coerulean, altogether exquisite and desirable."

Life has speeded up considerably since the American herbalist, Helen Fox, wrote her book *Gardening with Herbs* in 1933, making her thoughts on the importance of gardening even more relevant today. "Digging and planting in the garden is one way man can engage in the satisfying experience of working hard with his body while planning the next move in his head. Perhaps the reason gardening is so healing to modern man who is speeded up almost beyond endurance by the pulsing beat of machinery is that it requires deliberate, loving hands, and cannot be done in a hurry."

Eleanour Sinclair Rohde looks back in time in her book *The Story of the Garden.* She speculates on why people have maintained gardens throughout history. "One, that the persistent love of beauty crops out in men and women under the most adverse circumstances; another, that the leading men and women of earlier times invariably had and loved their gardens; a third that garden history, like that of the race, repeats itself."

How we feel in ourselves is, to me, a most important aspect of gardening. We often take measure of our skills by tangible results alone: numbers of vegetables harvested, size of chrysanthemum blooms, or successful cultivation of a rare alpine. Pride in such accomplishments is surely justified but what about the intangible results? Perhaps we are afraid of admitting that we have a philosophy of gardening all our own. Even though most of us may not express ourselves as well as Gertrude Jekyll or Reginald Farrer, we surely can empathize with what and how they wrote. We shouldn't fear admitting our romance with horticulture when we can share the feelings of these eloquent writers, who in their passion for gardening wrote so very beautifully.

I think finally that May Sarton clearly sums up the gardening experience for us. "Yes, gardening gives one back a sense of proportion about everything except itself. What a relief it was to me when I read that Vita Sackville-West kept a pile of metal labels in a shed at Sissinghurst as proof of all the experiments that had failed! I had until then, been ashamed of how much waste there was even in my unpretentious garden here. I blamed inexperience, impatience and extravagance. But now I have come to accept that one must not count the losses, they would be too alarming. One must count only the joys, and feel continually blessed in them. There is no unlucky gardener, for each small success so heavily outweighs each defeat in his passionate heart."

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growing interests

caladium humboldti

Of all the plants I've tried my hand at, this comes closest to being my favorite. For me, it grows all year-round—indoors under the fluorescent light unit in winter and outside under the grape arbor with our bonsai in summer.

Caladiums are herbaceous plants with tuberous rhizomes, native to tropical South America. They have been much hybridized, and there are dozens of named varieties in mottled colors ranging from deep pink and red to white and green. All require temperatures of 70° to 80° when in active growth and never lower than 60°. If the temperature drops much below 70°, the plants go dormant and sometimes stay so for months. Exposure to cold will destroy the rhizomes. On the other hand, if the temperature is maintained the plants will continue growing for surprisingly long periods. The plant pictured has not been dormant for over two years.

C. humboldti is a miniature. Its arrow-shaped leaves are 1 in. to 2 in. long and 1 in. wide. They grow on slender variegated stalks 6 in. to 8 in. high. The leaf colors are brilliant — pure white blotches in irregular shapes against a dark green background. Caladiums are ariods *(Araceae)* and, like so many plants in this family, have insignificant flowers. Actually, I don't recall ever seeing a flower on *C. humboldti,* but I know I haven't missed a thing.

I have not found a botanically accurate description of *C. humboldti,* which is also sometimes called *C. argyrites, C. lilliputiense, C. myriostigma* and, perhaps, other names. The plant rarely appears in catalogs, but a West coast supplier has recently imported a large number from, of all places, Singapore, where, PHS Council member Nancy S. Timms tells us, it is grown as an edging plant and is to be seen "everywhere."

The individual tuberous divisions are not long-lived. Two or three years seems to be about the average. But given very good winter light, high temperatures and humidity, this is a plant that is sure to delight its owner.

Ernesta D. Ballard



photo by E. D. Ballard

gentiana crinita

Beauty does not always come easily. Any one who has seen the fringed gentian in bloom cannot fail to covet it for her garden. It is a true blue to be compared to the sky overhead or the sparkling flash of an indigo bunting. Even success is short-lived, however, for it is a biennial. Having bloomed, it dies. But how satisfying this brief show can be.

Seed is widely available, and germination is slow but usually good in flats. Never let them get too dry. Slug bait is a wise precaution at all stages of growth. It is not imperative that the seed be fresh, but it should be stored in a cool place until sowing. It can be planted as late as March. Disaster most often strikes during the following winter.

Edgar T. Wherry attributes the winter loss to fungi that attack the seedlings. He recommends using sterile soil both for the germination process and then as a medium for potting the seedlings for their wintering-over. Pot individually while still small to avoid root damage. Winter over in a sheltered spot.

Set them in the sunny garden early the next spring, make sure they are watered in dry periods and hopefully late that summer there will be a magic spot of azure color. Never pick the flowers. If fate is kind, they may set seed and self-sow. To keep such glory, of course, you will have to start seed annually for at least two successive years because of the biennial characteristic of this beautiful native.

Bebe Miles



photo by Bebe Miles

Bebe Miles has published several books about native plants and bulbs and has two books coming out this fall: *Wildflower Perennials for Your Garden,* Hawthorn, New York, and *The Total Book of Bulbs: A Complete Guide for the Home Gardener,* Delacorte, New York.

digging for information



September is for Planning

by Ed Lindemann

old annuals always fade away . . .

Every fall and winter many people call me about the various degrees of decline affecting the summer annual that has been brought inside. As the name implies an annual plant germinates, grows, blooms, sets seed and dies in one year. Potting up a plant that has spent six months in a flower bed and is approaching the end of its natural life is usually a waste of time.

Two or three blossoms on a marigold or begonia can be very precious during bleak fall and winter days. If you can provide the correct growing conditions, light, high humidity and a cool night temperature, it is worth the effort to try some annuals indoors. The more sun you have, the more successful you will be. A night temperature of 50°-55° is ideal. Hot dry air created by central heating systems is not conducive to successful indoor annual culture. A cool night temperature will help keep the humidity at a higher level. A south facing window or sun porch is the best location. If you have insufficient natural light, consider using fluorescent light units.

Potting up a plant that has spent six months in a flower bed and is approaching the end of its natural life is usually a waste of time.

Plant seed for winter blooming annual plants in early to midsummer. Most of us are too busy weeding and watering in June and July to think about starting seeds. I have found that if you check annual beds in September you will find that many of the plants have seeded themselves. The new seedlings can be potted for indoor use.

Once you have found a location where winter annuals will do well you'll be tempted to try a variety of them. If you are a beginner I'd suggest starting with dwarf marigolds, alyssum, wax begonias and coleus. Stay away from petunias (they always get leggy), geraniums (they rarely bloom), and impatiens (it always gets red spider mite).

try to remember the kind of september . . .

People are often amazed when they learn that next year's Flower & Garden Show preparation actually begins before the current one ends. Planning a year ahead is a good practice in "real" gardens as well as those that grow in the Civic Center each March.

In the Delaware Valley, gardens are really at their peak in September. By late summer every plant, both tender and hardy, has developed to its fullest for the current season, and so, September is the time to study your garden carefully and to start planning additions, corrections and changes for the next year.

Take an hour or two and study your garden in detail. A pad, pencil and camera will be useful. I use a Polaroid camera because I can see at once if I've recorded exactly what I want. Don't worry about making major decisions at this point, but concern yourself with recording either in writing or photographically, items that need consideration. Divide the garden into areas and work on one at a time. For example, how did the vegetable garden turn out? Did some varieties seem to do better than others? Were the quantities planted O.K. or were there three times too many eggplants and not enough beans? Taking notes on the spot will save you time and money in February when the seed catalogs arrive and most of us lose all self-control when ordering.

Now also is the time to make notes on the success of annual and perennial beds. Did the colors work the way you planned? Was there enough height? A few color photos taken now will be a big help next winter when you try to recall what was good or bad about this year's planting.

The camera is also useful when planning for winter pruning. Did you ever really stop to study a deciduous tree or shrub in relation to its change in mass when in full leaf compared to midwinter. As long as the weather is not bitter cold, winter is an excellent time to prune. A few notes along with some photos of the plants in full leaf will act as a guide for pruning later on.

Each season in the garden has a purpose. September is the time when everything comes together. It is a time to enjoy, to evaluate and to remember.

a time for drying . . .

In a few short weeks it will be time to start preparing the garden for winter. As you start to clean up the various areas of your garden notice if you have material that can be used for dried arrangements, holiday decorations or winter craft projects. Collecting this material now will save frustration and searching in November and December.

Pods, cones, grasses, gourds, husks and berries are plentiful at this time of year and it is best to collect twice as much as you think you will need. Many items can be used just as you collect them. Bittersweet *(Celastrus scandens)* will last for months without preserving. Berries, pods and seed clusters may be dipped in a solution of one part shellac and two parts alcohol and hung up to dry. Be sure to dry some chrysanthemums in silica gel or sand and borax before the frost ruins them. The PHS library has an excellent section on decorating with dried material. Many of the references contain instructions for special techniques on preserving material.

Whether you plan an elaborate dried arrangement for the Thanksgiving table, or a few bunches of herbs hung from a beam in the kitchen, or an intricate seed mosaic to work on during long winter evenings, now is the time to collect your material.

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See story on page 4.



THE green scene

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Orchids as house plants



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THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 5, Number 2 Nov./Dec. 1976

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Front Cover: *Angraecum bilobum* Kirki (1¾ in. greatest dimension). See Story on page 3, photo by L. W. Zimmerman.

Back Cover: *Coprinus comatus* (Shaggy-mane). See Story on page 14, photo by Robert B. Taylor

growing orchids as house plants

photos by L.W. Zimmerman



The first thing to remember about growing orchids as house plants is that they are vegetative organisms, and as such, you can learn their requirements as easily as those of any other group of plants. The next thing is to make clear what I mean by house culture. I mean growing orchids without the benefit of greenhouse, Wardian case or artificial illumination. In other words, you can, in part, handle orchids much as you would any other plant material amenable to culture on a windowsill, such as begonias, geraniums, and streptocarpus, for example, although the culture of orchids differs in some respects from these plants.

Here, I'll introduce a little personal history to demonstrate a point. My wife, Mary, brought home some flowering plants of paphiopedilum back in 1942. As a result, over the next several years we accumulated so many orchid plants that every windowsill, except on the north side of the house, was filled with orchids of many genera, and with seedlings of both species and hybrids.

In the summer months we put the plants outside about May 15th and brought them back into the house as late as possible, but early enough to avoid frost. We found that certain plants could be brought into flower but others could not, even though they seemed to be growing satisfactorily. We did this for three years until we

continued

by L. Wilbur Zimmerman

L. Wilbur Zimmerman has grown orchids since 1942. He has been a certified judge for the American Orchid Society since 1955 and has judged extensively throughout the United States and Puerto Rico. He chaired the N.E. Region of A.O.S. Judging for five years. Zimmerman has made seven collecting trips for orchids to Mexico and Guatemala over the last 24 years as well as to Puerto Rico, the Virgin Islands and Jamaica.

Phalenopsis Elinor Shaffer, white hybrid, long lasting.

orchids continued



1.



2.



3.

4

These orchids can be grown on the window sill

1. *Paphiopedilum spicerianum* (flower 3 in. x 3½ in. long)
2. *Paphiopedilum* Battle of Egypt (3 x 3 in.) prime candidate
3. *Zygopetalum* B.S. White (flower 2½-3 in.)
4. *Doritonopsis* Red Coral x *Phalenopsis cornu-cervi* (flower 2 in. x 2 in.)



4.

were able to buy a secondhand greenhouse and boiler, since wartime restrictions did not permit building greenhouse structures at this time.

We were acquiring some knowledge about growing orchids in the house by this time and were looking forward to the greater ease and bloom available through greenhouse culture. To our chagrin we found that we had to learn all over how to manage orchid plants under greenhouse conditions. The techniques for watering, fertilizing, ventilating, and shading were decidedly different. After more than 25 years of experience with four greenhouses, we moved and have returned to small scale windowsill culture again.

What we have learned is that the person skilled in greenhouse growing may not be a good source of information for ordinary house culture nor the other way around. We learned, too, that while we were unable to flower certain orchids in the house, others flowered easily. Further, we found that not only did house and greenhouse culture vary from place to place, but from person to person as well.

The large showy cattleyas and cymbidiums are certainly difficult to bloom as house plants and would not be first choice for beginners. The exception is, that among cattleyas, fall bloomers can frequently be made to flower indoors more readily, because the buds are already showing in the flower sheath, and because the outdoor culture and summer's extended hours of sunlight impel growth. Paphiopedilums and phalenopsis are the best candidates and will more reliably produce flowers. There are a large number of species as well as hybrids in these two genera, so you are not restricted.

Light. Paphiopedilums and phalenopsis do not require as high a light level to bring them to flower as the cattleyas and cymbidiums. Be aware that while the light coming through a window is as bright as the light in a greenhouse, it is one directional and the plant only receives approximately a quarter of the overall illumination that a greenhouse provides and in addition loses much by the movement of the sun past the aperture of the window.

Even though the plant is rotated, it only receives light at any given time on the side toward the glass. Ample light is a key factor in making most orchids flower. At the same time, the leaf surface temperature at midday may reach too high a level, if placed in a bright sunny window facing south in late winter. Beyond 105°, tissue can burn, which causes unsightly damage and necrosis. It is necessary to diffuse light inside and to control the light when the plants are outside also; they should not be unprotected in full sun. Either hang them in a tree that will provide dappled shade or place them in a lathe house. The latter controls light better.

Watering requires careful observation to attain skill. A higher humidity than is normally available is required. A tray about 4 in. deep filled with pebbles and water is the simplest way to partially overcome the normal dryness of house heating. Some people

continued

orchids continued



View (from the outside) of windowsill plant group with *Paphiopedilum Maudiae* (Hybrid) predominating at author's home.

have said they can accelerate evaporation by heating the water in the tray with a submersion type heating unit like those used in aquariums. The potted plants should be set on wire mesh out of the water, to prevent the compost in the pots from becoming sodden. On bright days when the heat is on, water the pot and fine mist the foliage early in the day and mist again at nighttime. The misting simulates nighttime dew common to the native habitat of most tropical orchids. It's misleading to give definite times for watering; rather test with your finger well down into the growing medium to determine if the plant is really dry before watering. During spring and fall when the furnace heat is not high and when it is cloudy, the plants may well be damp enough not to need water on some days. Orchids should not be continually wet around the roots nor sit in water-filled saucers. Good judgment about watering also applies when the plants are outside.

The **potting material** is different from that used for other house plants. The one most readily available and most widely used is a fir bark mixture. The coarser form is used for plants with thick roots and the finer kind for plants with delicate root systems. Repot at least once a year. Generally, after the plant has bloomed is a good time to repot. Orchid roots deteriorate rapidly in stale, old compost.

Fertilize regularly. Soluble fertilizer used at 1/10 the strength listed on the package and applied about once a week is a good rule of thumb. A 15-15-15 formula or similar proportion is generally satisfactory. Some people claim that to minimize the build-up of fertilizer salts in the potting material you can alternate chemical fertilizer with weak solutions of fish emulsion. Another system is the use of slow release pellets or beads of fertilizer, so that a little of



Paphiopedilum venustum

the nutrient will dissolve with every watering. From November 1st to March 1st the fertilizer should be cut to a quarter as much as for the balance of the year because of the shorter daylight hours (reduced photosynthesis).

A more sophisticated addition to the feeding of the orchid plants is to substitute a soluble fertilizer low in nitrogen (5-10-5 or 5-15-5) from the middle of March until July 15th. The theory is that by cutting back on the nitrogen and supplying a little more phosphorous, there will be less vegetative growth and more flower production.

Temperatures commonly found in heated homes provide a satisfactory range. The windowsill can drop to a 55° fahrenheit at night and go up to 85° to 90° during part of the day when the sun is high (not by the thermostat). A variation in temperature from daytime to nighttime is desirable for most orchids to bloom.

During the day fresh air can be introduced by opening a window or door for several minutes in an adjacent room; there should be no sudden direct chill on the plants themselves. Some people provide air motion within the room with a small fan, but do not direct the air stream at the plants.

Orchids are not too disease prone. Scale, mealy bugs, thrip and fungus are the principal things with which to contend. Fortunately they are seldom all present at one time. Ortho-Systox general purpose spray liquid (or a similar compound), diluted as the label instructs, seems to do very well. Apply an absolutely fine mist for complete coverage with the insecticide. To retard fungus, Natriphene 1:2000 or Wilson's Anti-Damp are good materials; more recently Benlate has come into use.

Virus? Throw the plant away before you contaminate other plants by handling or splashing through watering. Be ruthless about that. Slugs can be troublesome when the plants are outdoors so screen them carefully before bringing them in in the fall. Metaldehyde preparations are reliable for slug control.

In summing up, we have found many plants that lent themselves to windowsill growing. Some were easier to flower than others. I suggest that you experiment with the plants that you like or plants that you have heard others have successfully grown.

Friends in North Jersey had a large bay window 6 ft. x 5 ft. x 18 in. deep in which they concentrated on the smaller scale orchid plants from 1 in. to 6 in. in height, exclusive of the inflorescence. They were able to raise more than 200 different orchids. Some of the interesting things that were successful with them were *Ornithocephalus bicornis, Oncidium pusillum,* several *lockhartia, Trichocentrum albo-purpurem, Epidendrum ghiesbreghtianum, Neofinetia falcata, Epidendrum tampense alba, Brassavola nodosa,* and numerous others. For many years a man in Washington continually confounded his friends, who grew orchids in greenhouses, by growing and flowering on the windowsills of his house species of orchids that most people were sure could not be done without a greenhouse. I mention this to show that an observant person, who is determined, can do things in the way of orchid culture that theoretically are too difficult to achieve. I wish you success.

●



our plans went a-rye

by David Boorse

Dave Boorse, who enjoys both teaching and gardening, finds greatest satisfaction in sharing gardening experiences with his own family.
Gwen, who is not pictured, missed most of the rye harvest while at school.
The Boorses anticipate next summer's garden and wonder what new thing is in store for them.

photos by Edmund B. Gilchrist, Jr.

As I sit in the summer kitchen near the large brick oven where the week's baking is done, snacking on recently baked rye bread and sniffing the aroma of the fruit and herbs now drying on the bricks still warm after a couple of days, the spring Flower Show seems so far away.

Each year at the Flower Show, I stop for a few minutes at Laurie Todd's book booth. Laurie was librarian at PHS when I was director of the PHS Summer Garden Camp and always helped me to find books appropriate for the young people in our program. While exchanging "My you haven't changed a bit" and "Remember when?" with Laurie, I spied a $2.00 paperback about green manure that promised to revolutionize my garden. Our soil did need help, so on the ride home I read about green manure and resolved to improve our soil.

The theory of green manure is simple: you grow certain plants specifically to improve the soil.* When the plants are grown they are turned under the soil and allowed to rot. They release needed minerals to the soil and improve its texture. At any rate, our plans went awry; we did not get green manure for our garden. We got rye and we did have a series of interesting projects in colonial technology, however. We also made flour from some grain that we thrashed from what had been intended to be green manure. The birds and the sheep benefitted from grain that fell to the ground and enough grain fell to the ground to self-seed small patches of rye that sprouted and will definitely and unequivocally be tilled under so that the garden will eventually have its green manure.

We began by planting perennial rye in the fall of the year, planning to plow it under after it began growing again in the spring. After the rye was sown, someone in our family asked the unfortunate question: "How do you get from a plant like that to a loaf of rye bread?" Questions like that work on you until they get answered and the answer occupied a good bit of our summer vacation. My father told us that as a child he helped to harvest rye on his grandparents' farm.

About that time I began to consider what might happen if Kissinger made a mistake with a decimal point and sold ALL our wheat to Russia. What would we do? Would my children be hungry, could I afford bread imported from Russia? I had to know if we could grow our own flour. That settled the matter. When the rye began to grow again in the spring, the section of the garden containing the thickest growing rye was not tilled with the rest of the garden. Business went on as usual in two-thirds of the garden, but in the rye patch we kept watching and wondering when it would be ready to harvest. Towards the end of July, Dad pronounced that the rye was ready for harvest.

We got out the scythe, sharpened it and began the harvest. Scything looks easy. It isn't! We had seen and tried the "way it used to be done" but before the harvest was over, I cranked up the sickle bar to try to finish the cutting, which was messy. Driving, beating, summer rains had left the field looking as though someone had gone through it with a giant teasing comb. No two adjacent stalks were aimed the same direction. Supposedly, the plants should have been growing in a more or less vertical direction and the trick would be to cut the grain in such a way that the stalks would all fall to the ground in the same general direction so that they could be gathered into bundles and tied. The teased, tangled mess of plants fell more like a game of pick-up-sticks requiring a good bit of hand sorting before the

continued

*See "A Productive Fallow" by John Gyer, *Green Scene,* July 1975.



bundles could be tied. Once the bundles or shocks were lined up along the picket fence, however, they added class to the garden. The gasoline powered sickle bar could be hidden from view behind them and the scythe could be propped in front of them in an artfully casual way in case some of our purist friends dropped in to visit our colonial farm.*

After the harvest comes the thrashing and winnowing of the grain. The thrashing is accomplished by taking a shock of rye and opening it on an old blanket and hitting it with a flail. Dad constructed a flail from an old broom handle sawed in two. Holes were drilled in the ends of the two halves and they were fastened together with twine. Flailing the grain breaks the heads and loosens the individual grains (seeds) of rye. At the end of this process you are left with the seeds and the trash. Each head of grain may contain about 24 to 50 seeds which is a 2500% to 5000% yield for the seed sown.

Winnowing rids the seed of the trash. Since the seed is heavier than the rest of the seed head, it tends to fall straight-

Above, Ray Boorse, the author's father, demonstrates proper use of the scythe. The trick to using a scythe is not to hold it up off the ground, but to allow the blade to skim along the surface with the cutting edge raised at a slight angle. A sickle bar mower or power scythe would have been quicker if the plants were not so badly tangled.

The shocks are tied with several strands of straw. Since harvest is down before the stems of the plants become brittle, the 5 ft. long stems are supple enough to make a good rope.



*At 44,000 square feet per acre, our rye field came to 75/1000 of an acre.

er to the ground and is less likely to be caught in a current of air and be blown away. The mixture of grain and chaff, as the trash is called, is tossed into the air when there is a gentle breeze to carry the chaff away and to allow the seeds to fall on a sheet or drop cloth.

The cleaned seed is the edible part. To use it for making bread, it should be ground into flour. Ancients did that by pounding with rocks, but if you do not have any rocks you can buy grinders and mills from $15 to $400 depending on what you want to do. We just used an old coffee mill we had around. It made a coarse flour that could be mixed with regular wheat flour for making bread. The reason for mixing is not to compensate for the coarseness of the rye flour, but because the wheat flour contains more gluten. The gluten makes the dough gooey and enables it to trap the tiny bubbles of carbon dioxide released by the yeast, which in turn causes the bread to rise; breads made from grains other than wheat generally do not rise as well so it is customary to add wheat flour to other grains. Whole grains of rye may be soaked in water until they sprout; the sprouted rye can then be added to the bread dough or you can soak the rye and cook like oatmeal or wheat meal (the long cooking kind).

Finding ways to eat it was not the major problem. Long before the harvest was over we knew that (1) five acres are not enough to grow grain for our own consumption and still do everything else we want to do, and (2) five acres of grain is too much to harvest by hand and do anything else. We

The teased, tangled mess of plants fell more like a game of pick-up-sticks requiring a good bit of hand sorting before the bundles could be tied.

now buy flour in 100-pound sacks and have time for the important things like staking tomatoes and debugging cabbage.

Some pleasant side benefits from our experiments with growing grain were the bicentennial cooking experiences we had. Our farm house, which antedates the Revolution by a third of a century, has a summer kitchen with a large brick oven at the back of the fireplace. We had been talking about trying to use the oven for baking for a decade, but other things took precedence. Now with home-grown, hand-milled flour for bread, how could we desecrate it by baking it in an electric oven? Some of my students at Penn State who had had experience with colonial technology helped me fire up the brick oven for the first time in over a half-century. Since then the oven has been used regularly and in hot summer weather when we like cold meals, all the meat is cooked and the bread and pies baked for a week at a time. When baking is over, the oven remains warm for at least two days and may be used to dry herbs or dehydrate fruits and vegetables from the garden.

Sitting in the summer kitchen near the large brick oven with a piece of warm bread, the two-pound bag of rye seed that started it all seems long ago. When I bought the seed I did not realize what an investment I was making in experiences and memories for our family. Well, next year we will do something about that poor, shaley soil.

●



Sam and Anna watch grandfather use the flail (two broom handles drilled at the tip and tied together with twine). It is an awkward tool to use until you develop a rhythm. A circular movement is used causing the flail to swing around in a series of arcs striking the seeds out of the rye heads. Without this rhythm the flail flops around sometimes hitting the grain and more often hitting the back of your hand.



Wooden bowl contains heads of rye before thrashing, plate has winnowed grain and drawer of coffee mill contains the coarse ground rye flour.

walnut trees



These trees may be hazardous to the health of their neighboring plants

Not so deep down in her heart, my wife wanted a flowering cherry. Our nurseryman had a fine specimen, close to 10 ft. high. He had sold it to a man who thought the blossoms would be pink; when they came out white, with only the faintest tinge of pink, the customer insisted that the tree be taken back. The price was only $25.

We dug a large hole and put in a couple of wheelbarrow loads of compost and very old manure. For two years the tree thrived. Then it stopped thriving and went into a decline. A few small branches died. We asked John F. Kennedy, our landscape man, to take a look.

What he looked at was a black walnut exactly 33 ft. from the cherry. "There's your trouble," he said. "You will have to move the cherry, or it will be killed by the roots of the black walnut."

"But the cherry is beyond the spread of the walnut," I pointed out.

"True, but the walnut roots are reaching its roots." He looked around the lawn for a full minute and then walked up the slope to a spot just below our rear terrace. "Plant it here," he said.

Never inclined to disregard sound advice that is paid for, we did what Kennedy advised. Today the cherry has a spread of 32 ft., thanks to its separation from the black walnut by 69 ft. Its mass of white blossoms is a spring event we cherish as much as the return of the barn swallows.

Except for two elms and an arbor vitae, the only trees around our house and barn were nine black walnuts. One elm was dying and we had little hope for the other. We needed information on what could live—and what could not—around black walnuts. The best source we found was a 32-page pamphlet, Bulletin 347 of West Virginia University's Agricultural Experiment Station, *Effect of Black Walnut Trees and Their Products on Other Vegetation,* written by Professor Maurice G. Brooks.*

Professor Brooks began his study of black walnuts in 1939 and continued a dozen years, amassing data on woody and herbaceous plants growing within the root spread of 300 black walnuts. The trees, 12 in. or more in diameter, were mostly in West Virginia, but five Virginia counties, three Ohio counties, two Maryland counties, and one Michigan county were included.

The survey showed that some plants flourish beneath black walnuts and others cannot survive. In poor pasture land on a West Virginia farm there was a 70-ft. black walnut. The ground beneath it was richly filled with Kentucky bluegrass, timothy, redtop, black raspberry, fleabane, asters, goldenrods, mints, violets, clovers, and three species of fern. All of these plants were scarce or absent beyond the spread of the tree.

On another farm, three acres were planted with apple trees. A black walnut in the middle of the plot was left standing because its nuts were excellent. Within three years the six apple trees within the root spread of the walnut died, and their replacements succumbed three years later.

Trees that tolerate contact with black walnuts include the hawthorn, American elm, beech, locust, tulip, white oak, and red cedar. Among the many that suffer are the white pine, hemlock, arbor vitae, sweet gum, American holly, persimmon, and black ash. Professor Brooks's tables show the number and percentage of occurrences, within the rootspread of the 300 black walnuts, of 60 species of trees, 25 shrubs and woody vines, and 124 herbaceous plants.

I have long been interested in the native ferns, and it was encouraging to find in another table that three of my favorites—the ebony spleenwort, the Christmas fern, and the grape fern—are from two to six times more common under black walnuts than elsewhere.

The substance that stimulates bluegrass and exterminates apple trees is juglone, which is a naphtha-quinone. It was extracted and purified by E. F. Davis, who reported in 1928 on its toxic effects on tomato and alfalfa plants.

My wife is a lover of all trees. When I first suggested that our over-supply of walnuts prevented us from planting more interesting species, she looked at me as though I had proposed gunning down some of the extra children of the neighborhood. I waited a year or two before bringing up the subject again. Then I pointed out that the arbor vitae at our front door was dying from the top, and the largest walnut on the lawn was only 30 feet from the afflicted tree.

That settled the issue. We agreed to keep the three walnuts in front of the barn and take out six others around the lawn. A sawmill operator did the job on May 4, 1964, a day when Nancy was out of town. He charged 5½¢ a foot for 1,323 feet of rough lumber, which we stacked outdoors for a year's weathering and then stowed in the barn. Many of the pieces were inferior, some had remnants of bark, but at today's price of $2.25 a board foot the pile in the barn has earned its keep.

We also hired a man with a stump-chewing machine to prepare the ground for grass. That was fairly expensive, for we had to replace teeth that were broken by stones—and Bucks County has no shortage of rocks.

Any careful reader of Professor Brooks's pamphlet can quickly win recognition as a horticultural authority. For example, we were introduced to a couple near Leesburg, Virginia, hard at work in their front yard. They were concerned because their planting of laurel beneath a tree was not doing well. I said they would have to choose between the laurel and the black walnut. Never heard from them again.

When my wife and I were discussing what shrub to plant around our parking area, beneath three walnuts, I wrote to Professor Brooks, who passed along

by Alexander L. Crosby

*The pamphlet is free from the University Publication Office, Morgantown, West Virginia 26506.



Japanese cherry that was rescued from walnut roots.

a report he had received from the Federated Garden Clubs of Michigan. These six will grow: *Cornus racemosa, Euonymus alatus, Euonymus europaeus, Euonymus vegetus,* five-leaved aralia, forsythia.

And these six will not: Hopa crab, *Magnolia soulangeana,* Nanking cherry, Persian lilac, Russian olive, *Virburnum sieboldi.*

We chose a dwarf variety of *Euonymus alatus,* which has grown tremendously. Each fall these plants provide a fiery display.

A week after the demolition of the walnuts we planted a 30-ft. red oak in a splendid hole that had been filled with four truckloads of topsoil and one of cow manure. Since then we have added three sweet gums, a yellow-wood, three dawn redwoods, two crab apples, a smaller red oak, a red maple, and a red horse chestnut. It would have been simpler and cheaper to have kept all of the walnuts but, ignoring the good advice once given by a landscape man, we persist in a fondness for variety. Further, the $200 tree from the nursery gave us a name for our place: Red Oak. Much better, we think, than Black Walnut or *Juglans nigra.*

●

Free lance writer Alexander Crosby believes that his wife has forgiven him for cutting down six black walnuts in 1964.



photos by author

Two walnuts before our barn (tree at extreme right is an elm), with *Euonymous alatus* growing at left.

Pleurotus ostreatus (oyster mushroom)





Morchella esculenta (common morel)

photos by Robert B. Taylor



Morchella semilibera

A Mushroom Adventure

by Edwin A. Peeples

Edwin A. Peeples wrote *A Professional Storywriter's Handbook* and *A Hole in the Hill.* He contributes articles and stories to *Inquirer's Today* Magazine and to major national magazines.

Europeans are enthusiastically venturesome about wild mushrooms. Americans are not. That may be because we have had for a long time and at reasonable prices good supplies of the field mushroom, *Agaricus campestris,* which is the commercial mushroom. Identifying wild field mushrooms is said to be easy and reasonably foolproof, if simple prudence is exercised. Too often, though, people gathering wild ones have poisoned themselves by carelessly mixing in with the safe mushrooms specimens of *Amanita verna,* which is lethal. Both mushrooms can look the same from the top. So the picker who does not look underneath for the pink or the brown of the agaricus—the gills of the amanita are white—can easily make a fatal error, particularly if he picks in haste.

Fear of this deters most people from interest in any wild mushrooms. Propose to 99 of 100 people that you intend to gather, cook and eat wild mushrooms, and they will react as if you said you were going to sluice down half a pint of henbane, hemlock or datura juice.

My wife and I were no exceptions. Despite having 65 acres of woods and fields, we hewed for years to custom. We trod down morels, kicked away puffballs and demolished oyster mushrooms, as if we were ridding the world of some incipient plague.

One year, after a large herd of cows had grazed our front pasture, the autumn rains brought up a crop of

continued

A Mushroom Adventure continued

puffballs thick as pumpkins in a patch. An Italian mason, who was working for us, saw them. Could he and his wife pick them? Sure. We watched. They went off with three bushels. We went off shaking our heads.

We might have continued in our ignorance, if a book on mushrooms had not gained wide circulation in the sixties. The book was *Mushroom Hunter's Field Guide,* by Alexander H. Smith, University of Michigan Press.

Smith is fairly swashbuckling in his approach to gathering and eating. Some mushrooms, he says casually, are poisonous to some, edible to others. Some are considered edible but not recommended. Some are edible but objectionable and tough. Some are edible so long as not accompanied by alcohol. The book is a delightful, personal log. The important thing Smith said to us was that there are some wild mushrooms that absolutely cannot be confused with anything poisonous.

Chief among these are the morchella, the morels. There are true morels and false morels. Some of the false morels are poisonous, but the false ones do not remotely resemble the true ones.

Reassured, my wife and I went into our woods in early May, the best time to find morels. The mayapples were beginning to bloom. And we had beginner's luck. Scattered through a beech wood, beneath mayapples, we found abundant quantities of *Morchella hybrida, angusticeps, esculenta* and *crassipes.* These mushrooms, universally phallic in shape, rise on thick stalks of dead white, cream, yellow and even yellowish gray. The heads have vertical, sponge-like slots and vary in color from russet through shades of orange and yellow to gray.

On our first try, my wife and I gathered three gallons of morels. Sautéed in butter, they had a rich, slightly bacony taste. We ate quantities that way with steak and finished them off in omelets. The morels were more flavorful and much richer than commercial mushrooms, and we understood why they are considered one of the world's great delicacies.

Unfortunately, morels cannot be cultivated; often do not appear at all, being very sensitive to temperature and moisture; do not always come up in the same place and, in these parts, are seldom found except in the spring. We've never found another crop as abundant as the first, although most years we've found enough for one or two meals.

Once started on wild mushrooms, we sought other literature and found another good book, *Common Edible Mushrooms* by Clyde M. Christensen, Charles T. Branford Company. A simpler and clearer book than the *Field Guide,* this one has color plates and describes the method of making spore prints, an easy and essential step in identifying umbrella-shaped mushrooms.

Armed with this book, I toured our woods and found an abundance of white, soft mushrooms growing out of stumps. These grew in dense clusters, had slick, grayish white tops and, from beneath, looked like groined arches in a cathedral. They matched Christensen's description of *Pleurotus ostreatus,* the oyster mushroom. I ran a spore print to be sure. The spore was white, as it was supposed to be. So I sautéed some. My wife, not entirely persuaded I had identified it correctly, thought only one of us should experiment with eating it. The other should be handy to call the ambulance and explain what had happened, in case I fell into convulsions.

I survived, and we had a new delight.

The oyster mushroom is highly aromatic with a cloyingly sweet perfume. Once you know this odor, you can identify oysters quickly. The fragrance, a drawback because you can tire of it quickly, can be overcome in the cooking. Oysters are large and, when found, usually abundant. Often a single clump will fill a three-gallon pail. Sliced in strips and sautéed, the oyster looks like chicken breast. Lightly sautéed it retains the fragrance. Sautéed until it grance, which seems to be quite volatile, and then tastes like nuts.

The beauty of the oyster is that it appears from spring until fall, is highly visible and plentiful, is attractive when cooked and continues to come up in the same places year after year. The French are said to have favorite oyster stumps which they water regularly to get continuous crops. The Germans have found they can cultivate this mushroom on fresh-cut stumps in the forest.

Having succeeded in these two ventures, we began to gather puffballs, *Calvatia gigantea,* whenever we found them. The puffball usually appears in fields where animal manure has been abundant. It is a round mushroom, hooked to the ground by an umbilicus. It has no spore slots. As it matures, it dries to a sac of powder, bursts and scatters the powdery spores. Because immature puffballs can be confused with amanitas, the safe practice is to always gather large ones. Small puffballs are an inch or two in diameter; large ones, from three inches to a foot.

To be edible, the center must be white, moist and the consistency of marshmallows. As the puffball ages, the white discolors to yellow, then green, and edibility is at an end. The puffball, sort of the beefsteak tomato of mushrooms, is delicious when sliced to the thickness of scalloped potatoes, sautéed in butter or meat essence and served with meat.

Beyond these three, my wife and I have identified two other mushrooms: one disappointing; the other, the best of all.

The disappointing one was the shaggymane, *Coprinus comatus,* which is one of the inky caps. These, esteemed a delight, especially by the English, must be picked and cooked at once. Let stand, they disintegrate quickly into an inky, revolting-looking fluid. Hence, the name. My wife found the first of these. They grow in fields, have a mushroom shape with an oval cap that looks as if it had been nicked with a razor. Generally they are white with gray gill slits. We cooked our shaggymanes within twenty minutes of picking them. They tasted like chalk. As with other mushrooms, we sautéed them. It may be that cooking them another way would make them choice.

Our delight was the *Clitopilus abortivus,* which has no common name. We found this growing in our lawn under a walnut tree near the house. The cap is often malformed, hence, *abortivus,* because it is attacked by a mold. The mold does not hurt its edibility. My wife identified this one by its pink spore print and firm white flesh and did the first sample eating of it. Our guides suggested the cap color would be pink, but the ones we found, though pinkish, were more often a liverish purple.

Sautéed, the clitopilus has a nutty mushroom flavor touched with a suggestion of anchovy. For two years, if we were careful with our mowing, we had abundant crops which kept coming for a week or ten days in late September and early October. Then, as suddenly as they had appeared, the clitopilus disappeared. They grow on the ground under hardwood trees, and the condition of the tree must govern their growth. The walnut under which ours grew was dying. When the tree died, the clitopilus disappeared.

We still have vast fields to conquer on mushrooms. We have yet to find and identify edible boletus, the favorites of Joe's Restaurant* at Reading, or lactarious, polyporus or chanterelle, among the many that are possible. This is probably because we only have time to make intermittent searches, usually when we are doing something else, such as berry picking or gathering wild flowers for drying.

Also, we have not gone at mushroom gathering the way intense followers of the late Euell Gibbons have gone at finding other edible plants. To us, the wild mushroom is a luxurious delicacy which we come upon more often than not unexpectedly, as a kind of natural reward.

It is a reward anyone can have who will get the books I've named or any of a variety of others and wander the woods and fields with his eyes open and his mind curious.

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For mushroom lovers

**Ed. Note.* Joe's Restaurant, 450 S. 7th Street, Reading, Pa., Tel. 1-373-6794.

Joe has been described as a "mushroom freak." He and his wife Wanda pick the wild mushrooms used for the martinis, soups, appetizers and entrees at the restaurant. The lobby is filled with breathtaking 8 x 10 color photos of mushrooms. Joe aslo has a laboratory upstairs, which he will show you if he isn't too busy.

The restaurant is unprepossessing on the outside, but rather elegant inside. And it is expensive. Seating is limited and reservations should be made well in advance.

The Hanging



figure 1



figure 2

photos by Edmund B. Gilchrist, Jr.

Poinsettia Basket

by Ted Muehlmatt

Before we had growth retardants and lower-growing, self-branching varieties of poinsettias, we did have a method of shortening a poinsettia that might become too tall. The method was called "folding," and it involved exactly what the name says; the elongated stem of the plant was bent down, or folded, then bent up and tied, thus shortening the stem considerably.

Six years ago, while attempting to create an attractive hanging basket of poinsettias for the Christmas season, I began to experiment with folding the stems to make them cascade — the results were promising. Over the years, I have improved the poinsettia hanging basket to the extent that it comprises a sizeable portion of my Christmas sales. I would like to share the process with *Green Scene* readers who might want to try it and at the same time review poinsettia culture for those who might be satisfied with just bringing a poinsettia to bloom.

I start in late August with well-rooted cuttings of Annette Hegg or Rochford varieties of any color. Around the outer edge of a 10-in. hanging pot I plant five cuttings in a mix of one part top soil, one part peat moss, and one part vermiculite, with a pH between 5 and 6. Since the finished poinsettia basket will lack foliage and color on the top, I plant a small variegated spider plant *(Chlorophytum sp.)* in the center of the planter (Fig. 1). The temperature and light requirements of the chlorophytum are similar to those of the poinsettia; thus these plants are compatible. The spider not only fills the center of the hanging basket, but its green and white foliage accents the color of the poinsettia—they look as though they were meant for each other.

After the plants are well-established in their new container, I start a feeding program that I follow during the entire growing period of the poinsettias. Because poinsettias are heavy feeders, I suggest a constant feed program on one teaspoon of 18-18-18 soluble fertilizer per gallon of water instead of just water given each time the plant is dry. An alternative to the liquid feed is two tablespooons of electra applied once every month. Electra is an old reliable organic fertilizer that greenhouse workers have used for years, and is now available in small quantities for the home gardener.

My next concern is pinching the established plants, and this must be done at the proper time. If I start the basket in late August, I pinch the plant between the 6th and the 10th of September, leaving four or five leaves on each stem. At each leaf or leaf node a stem will develop which will eventually produce a flower; therefore, I have planned for 20 to 25 flowers on the finished basket.

Poinsettias like as much sun as they can get during the period preceding flower development, so I select a location of maximum sunlight. Temperatures during the early stages of development are not too critical and I advise avoiding extremes: 65°F at night and 75-80° during the day is adequate. The most critical period for light and temperature is from early October to late November. During this period of flower and bract development it is absolutely necessary that the plants receive a short day of bright sunlight, and a long period (12 hours or more) of total darkness. Night temperatures are best at 62-65° and day temperatures around 75°.

Through trial and error I have found November 1st to 5th to be the best time to fold the stems of the plants in the baskets. The first step is to dry out the plants a little, but not so they wilt. Next, I select an area on the bottom of the stem, usually between the first and third leaves, and squeeze the stem firmly between my thumb and forefinger (Fig. 2). Because the poinsettia stem is hollow, it flattens where it is squeezed. Now I move my fingers slightly up and down from the initial pressure point, squeezing with each slight move, until I have flattened about 1-1½ in. of the stem. The flower now falls over, and if it is flattened in the right spot, it will fall where I want it (Fig. 3, p. 20). This is done to each stem working from the outside to the center of the basket. Don't be alarmed if the stems are crushed or split (Fig. 4, p. 20), the stem and flower will usually survive with just a piece of stem still connected at the point where it is flattened. In the first paragraph I noted that the poinsettia was tied after it was bent and folded in the old days. I don't tie mine; I find I achieve a better cascade effect by not tying it.

If you go through this process, you will probably step back at this point and remark, "I have just destroyed a beautiful plant!" Do not despair. Your folded poinsettias will look poor for about a week only. With each day the leaves will turn toward the light, the bracts will turn upward slightly to seek the sun, and by early December you will have a graceful masterpiece.

From late November until Christmas, the night temperatures should be dropped to 58-60°, and the day temperature to 65-70°. The bracts will enlarge and the color of the plant intensify.

During the past Christmas season, I experimented with variations of the size of hanging pot and found that the

continued

Poinsettia Basket continued

process outlined above will work in any size or shape of container, provided that the number of plants used is proportional to the size of the pot. In other words don't crowd too many plants into a pot to achieve fullness. One of my nicest little hanging baskets was a single branched plant in a 7-in. container (Fig. 5). After turning down the developed blooms, I added the finishing touch of a nice full bow of red ribbon instead of a spider plant.

The new varieties of poinsettias being offered today are one of the best values of any seasonal flowering plant. It is not unusual for a poinsettia to have its color as late as March or April. So, a hanging basket of folded poinsettias would be well worth the time and effort, not to mention the satisfaction of having created something unusual and beautiful.

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figure 3





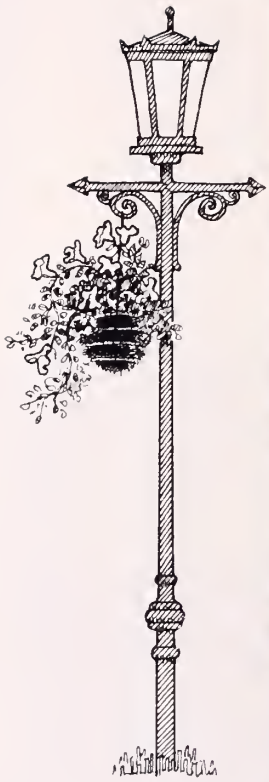
figure 4

Ted Muehlmatt was born and raised in a family greenhouse operation. He has been active in the business since 1950, and for the past 7 years has been operating the greenhouse alone, specializing in poinsettias, specimen hanging baskets, and seasonal specialty items. He is a member of the board of directors of the Delaware County Growers, exeuctive committee of the Co-operative Extension Service, board of directors of the Pennsylvania Flower Growers, and the Horticultural Craft Committee of the Delaware County Area Vo-Tech Schools. Muehlmatt has exhibited in the Philadelphia Flower and Garden Show since 1970, and in 1975 received the Best of the Show award in the floral category for his exhibit. In 1974, his folded poinsettia basket was chosen as the Most Outstanding Hanging Basket in a statewide show.



The cascading poinsettia

figure 5





Planting Ambler

no longer a run-of-the-mill town

by Judy Passmore McNeal

Can you make an ordinary town special? Can you wake up a "bedroom community"? Can you motivate people who never did anything about their town's appearance, to participate, even volunteer, to enhance it? In Ambler, Pennsylvania, we found a unique combination: Businessmen's Improvement Association, a mayor that cares, and Donna Swansen, a woman who makes things happen.

From 1682, when William Penn granted its 408 acres to William Harner, until the chemical companies moved in late in the 19th century, Ambler was a mill town. Until recently, Ambler could have been called a "run-of-the-mill" town. But not today. Some people have awakened community spirit and filled the town with flowers, color, and most of all, some pride. Here's how it happened.

Several years ago, the Swansen family drove through a section of West Philadelphia where window boxes were filled with flowers at every house and where no paper littered the streets. Donna Swansen learned that this section was the project of Louise Bush-Brown and the Neighborhood Gardens Association, which she founded in 1935. Bush-Brown lived in Ambler, and had been director of the Pennsylvania School of Horticulture for Women there from 1924 until 1952. (PSHW was taken over by Temple University and is now part of Temple University, Ambler Campus.)

When Donna Swansen and her husband moved back to Ambler from Philadelphia, the first thing she did was to enroll at the Ambler Campus for horticulture courses. While preparing a research paper for a course in Urban Annuals and Perennials, she read a pamphlet put out by the American Nurserymen's Association entitled *It Depends on YOU*. Swansen decided to major in planting Ambler.

Swansen learned through research that plants along the street cut down on noise and help combat pollution. That would be a considerable benefit to a town bordered on the north by the 309 Expressway and the south by the Reading Railroad, which had clocked as many as 10,000 cars a day down the main street, Butler Pike. Research also showed that plants add community pride and hope, which was sadly lacking in Ambler. While a few merchants had improved their storefronts, the only effort to plant anything had been made by the Junior Colony Club, in cooperation with the Businessmen's Improvement Association (BIA), which planted English yew shrubs *(Taxus bacata)* in cement pots down one side of the street.

In February of 1973, shortly after Louise Bush-Brown died, Swansen met with the BIA to discuss the possibility of starting a Louise Bush-Brown Memorial Fund to finance a planting. Her idea was that it would be fitting to take what Bush-Brown had done in Philadelphia and do it in Ambler; it would be a living memorial. Bret Carberry, president of the BIA, reported later that they raised $700 from 30 donors. Things were starting to move.

The Ambler Planning Commission chairman, Carson Mort, supported the project, and accepted the responsibility for the design and structure of all window boxes. Rick Romano, from Ambler Laboratory, offered to provide the trucks and manual labor. Progress was momentarily halted when they couldn't find planters.

Certain-teed Corporation was approached. They had been under fire because of the huge deposits of chalk-



photos by Beauveau Borie

like wastes (with traces of asbestos) that virtually blocked out the sun on the south side of Ambler. Investigations had failed to show harmful amounts of asbestos, but the "white mountains," as they had been dubbed, were ugly and Certain-teed was unpopular. Why not trade in some of the bad publicity for some good public relations? Could their cement and asbestos pipe be used for planters? Not only did the company agree to supply the pipe, which usually sells for $30 a foot, but they cut it to size and delivered it to the sites!

Neighboring Upper Dublin Township agreed to provide cinders "if you come and get 'em." Sold. Also available was a huge compost pile and some cinders. These were mixed in the correct amounts (1/3 soil, 1/3 cinders, 1/3 compost), placed in 3 mm. double plastic leaf bags, and put into the pipe planters. Now for the plants.

Ambler is a primary-color town with its bright yellow Sherwin Williams, red Woolworth's and blue municipal parking signs in the center of the business district. Swansen and the group of six she had assembled from the Temple Ambler campus decided to use the brightest colored flowers possible: marigolds, calendulas, petunias, vincas, dusty miller, salvia and China doll dianthus. Since they had run a plant sale successfully in previous years they knew where to buy the plants.

The inevitable question arose: would vandals destroy the plants? The year before the project started, Swansen and a group of Girl Scouts tried a planter project at a traffic circle on a densely-populated edge of Ambler. A child's 5-ft. plastic swimming pool was fitted into a latticed framework composed of discarded arms of telegraph poles and filled with annuals (see illus., p. 24). Children would pass the planter daily walking to and from the high school and an elementary school. Dire predictions were voiced. But in a test year, when there were annuals in the summer, chrysanthemums in the fall, and bulbs in the spring, the planter remained intact.

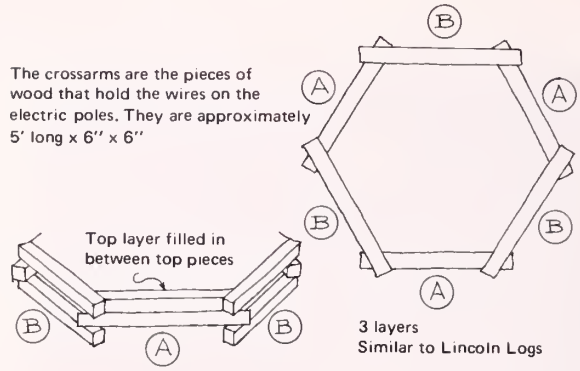
Swansen and her group started with the bridge crossing over the Wissahickon Creek at the entrance to Ambler. Here, sturdy Douglas fir redwood-stained boxes sat on the concrete railings and overflowed with vinca vines, pelargonium, red geraniums and blue and white petunias. At almost every northeast corner through the Ambler business district, groups of two, three and sometimes five planters were filled with petunias, ageratum, ivy, lantana and geraniums. Baskets of Reiger begonias hung from the balcony of the Wyndham Hotel.

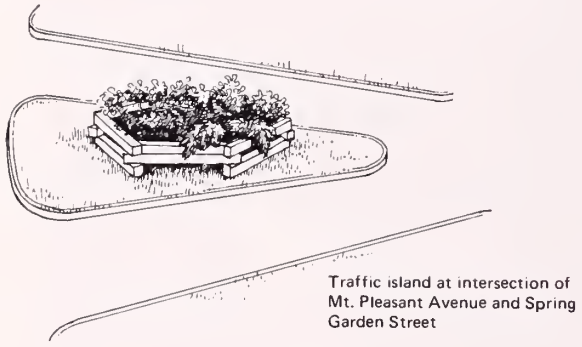
In every case the group took sun, shade and wind conditions into account. In shady spots, such as the steps leading up to the post office, they used impatiens and begonias, while at one gas station, where there was literally no shade, cactus and succulents were added to the profusion.

In the first year, summer 1974, 25 planters appeared in 11 locations. Each site had a captain, and each captain had a "crew" of two "plant persons," usually scouts. The groups were made responsible for planting late in the day and watering three straight days after planting. Thereafter they watered two or three times a week depending on the weather. Sites convenient to both captain and crew were chosen, and they were encouraged to plant together since the success of the whole project depended on their having a good working relationship.

continued

Planting Ambler continued







Girl Scouts planting the piple planters.

Success of the project was contingent on some of the following:

1. Calendars. Each site had a calendar in the store or gas station near the planting. It was marked by the person who watered it and the site captain who checked the site each week. An "All-Sites" captain checked each site once a month and checked back with Swansen. Attached to each calendar was a plastic bag with the correct amount of a fertilizer, Peter's 20-20-20, to be used at the end of each month. The telephone numbers of the team were posted in case someone had to miss a turn. Sometimes water was available at the site, but it was often brought in plastic gallon milk jugs from home.

2. Usually site owners were not asked to water their own plants. They paid for them through their contribution to the project, but they could enjoy them without the responsibility.

An exception to this rule was Ralph DelConti, a jeweler on the main street, who not only maintained his window box, but actually added plants and herbs. Mrs. DelConti said that everyone who walked in the store made a nice remark about the flowers, but her favorite came from a man picking up his wife's watch who said, "It really looks like someone around here cares." Other people started to care.

In the second year, summer 1975, the number of sites doubled and other merchants were approaching the group to have planters put in front of their stores. Finally the last holdout, the Reading Railroad, agreed to go along with the planting. The Reading station had long been an eyesore, and Swansen jumped at the chance. She enlisted the help of a local Boy Scout troop, but, when they all left for Canada on a camping trip, the job was hers. She ran into vandalism here because the station was unstaffed after four o'clock and some young people wrecked the planters repeatedly. But, she replanted after each episode, and said, "They quit before we did."

The Mayor of Ambler, George Saurman, figured prominently in what happened in Ambler. He has done for Ambler's government what Swansen and her group did for the spirit of the town. Swansen frankly says she wouldn't have been interested in staying with the project for so long if she hadn't had such respect for the mayor. She just as candidly admits that if she were to withdraw from the project today, it would go on because enough people with enough enthusiasm have made it their project, too.

One result of planting Ambler is an every-other-Saturday morning cleanup at a nearby train station by a local garden club. But the most important tangible result is that the Borough Council, BIA, and the Ambler Planning Commission have jointly hired a consulting firm to look into the needs of Ambler, study its traffic patterns and discuss plans for a face-lift of dramatic proportions. That wouldn't have happened four years ago. There had to be a feeling of esprit de corps not only among the leaders of the community, but among its citizens as well.

Ambler is on its way up. You can see it and feel it. Maybe you know of a town that could come back, too. Maybe it's your town. Ambler is succeeding because enough people want it to, and are making it happen.

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Judy Passmore McNeal is a free-lance writer and a student in journalism at Temple University's Ambler Campus. Her husband Dick is the horticulturist in the family, and they have a sunporch full of plants all winter. In the summer, their pride and joy is a fernery around the patio.

poisonous plants

The Case for the Guilty Garden

by Robert F. Lederer
Executive Vice President
The American Association of Nurserymen

The agricultural community – more specifically the nursery and florist portion of the industry – is increasingly damaged by a proliferation of false and misleading commentary on the subject of potential hazards from plant life. The publication of half-truths and myths works a serious disservice on the general public as well.

The following statement is reprinted with permission of AAN to place this matter in an accurate and reasonable perspective.

I've been reading a number of books, magazine articles, and press releases with some really great titles – if you're a mystery story fan. Look at these:

"Deadly Harvest"
"The Sinister Garden"
"Poison in the Backyard"
"The Deadly Dozen"

Pretty scary, aren't they! These days when mass hysteria seems almost a way of life, it takes a pretty bloodcurdling title to attract attention.

And that would be all right, perhaps, except that *these* books and articles and newspaper columns aren't mystery-suspense stories. They all deal with the same subject: some plant life that grows contains substances harmful to humans under certain conditions.

That has been true, of course, since the beginning of the world – and it is a fact that every one of us must learn at about the same time we learn to live with matches, electricity, water, strange dogs and cats, traffic in the street, medicine cabinets, table salt, and any number of other elements in our environment.

But that's not the way the subject is being approached these days. The approach taken by most of the materials presented to readers makes a very strong impression that mother nature is lurking in every dark corner waiting to pounce with her green, growing weapons of death. And, unfortunately, a normally responsible news media has let its guard down and appears more than anxious to print such damaging and false claims.

investigating the "crime"

First, let's look at the weapon: poison.

A booklet written by a physician carries this statement: "In 1967, 2,890 poisonings by plants occurred; 2,884 of these involved children under five years of age." Think of it. 2,884 little children poisoned by plants in a single year!

The problem with this kind of statement is that it is misleading. In fact, knowing that it was written for laymen, a case can be made accusing the doctor of making a *false* statement. The fact is, the word *poison* is usually interpreted by the average reader to mean *death*. What *does* it mean?

The term "poisonous plant" designates many kinds of plants as well as a wide range of poisoning effects. The effects may generally be classified as: allergies; dermatitis or skin irritation; internal poisoning caused by eating plant parts; and mechanical injury from sharp prickles, spines or thorns. That's the definition in one of the authoritative books on the subject, written by a botanist and a pediatrician, James Hardin and Jay Arena.

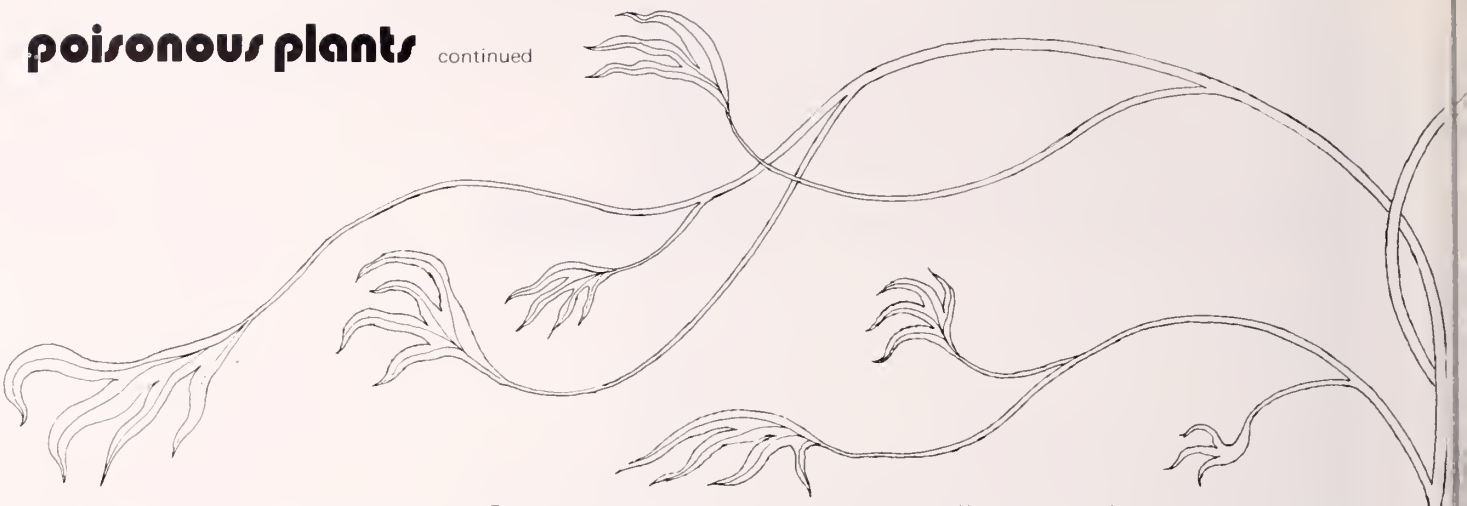
So that's the weapon we're talking about. Plant poisons. They can make you sneeze, itch, scratch you, and some, taken in the wrong dosage, can make you sick or even kill you.

the source of the "clues"

But we need more facts, and there seems to be just one source of information on reported cases of "poisoning" from plants. That's the National Clearinghouse for Poison Control Centers in Washington, D.C. The statistical information in the books and magazine articles and newspaper releases on the subject all comes from that Clearinghouse. It was established in 1958 as the Poison Control Division of the Food and Drug Administration's office of Product Safety to collect the experiences of the hundreds of Poison Control Centers in cities all across the country and to distribute information

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to them.

It's interesting to see what can happen with the kind of statistics the Clearinghouse publishes.

Look at this headline from a supposedly reputable magazine: "Poisonous Plants Grow Everywhere – Even In Your Own House. And A Surprising Number of People Have Died from Eating Them."

Or this statement from a magazine article: "Of the 13,000 victims stricken by plant poisoning last year, some fatally, 12,000 were children."

Those are very frightening statements. But let's check them against the Clearinghouse report from which the writers got their information.

53 people were hospitalized that year for suspected ingestion of harmful plants. One person died from eating a quantity of rhubarb leaves.

So, the writer who used the phrase "some of them fatally" was writing about one person. And the other writer's "surprising number of people" also turned out to be that same individual. This kind of journalism is, of course, readily accepted by the reader but in fact serves no one's best interests.

So let's look even more closely at the data that is available from the National Clearinghouse for Poison Control Centers.

Although the Control Centers were originally established to serve the medical profession, last year 86% of the calls dealing with plants came from non-medical people. Instead of answering questions from medical professionals, the greatest number of cases were inquiries by concerned parents calling for information when their child had eaten some form of plant. This is a valuable service the Control Centers provide, and the first thing a parent should do is call a physician or the Poison Control Center at the slightest suspicion that a child has eaten something "off limits."

But look what happens then. When the report of an inquiry is sent into the National Clearinghouse it goes into the computer as a reported case of ingestion, and a writer who is careless, either accidentally or intentionally, can translate that as a case of plant poisoning.

Here's an actual example. Somewhere in this country last year someone called a Poison Control Center and said, "My child has just eaten some wild blackberries! Is he in danger?" The people at the Poison Control Center probably looked in their records and said, "No danger. They're perfectly safe." (I'm quoting the blackberry information from the Hardin and Arena book I mentioned earlier, by the way.)

You've heard about poinsettias. "Take a bite of a poinsettia leaf and you'll die."

Well, [they] mixed batches of homogenized poinsettia parts and force-fed the mixture in large doses to 160 laboratory rats.

What happened? Nothing. None of the rats threw up, or stopped eating, or got unromantic or died.

So far, so good. But that call about blackberries—and two others like it—are listed in the Clearinghouse report for 1970 as cases of ingestion—and blackberries are listed in their run-down of "Types of Poisoning." That's preposterous!

You think that's an isolated example? Not at all. A quick count shows at least 26 titles which don't belong on the list. "Beans," for instance. Just plain "beans!" Mulberries. Spices. That's right, a category identified as "spices." Wild strawberries. Catnip. Nutmeg is on the list, and that's not even commonly available except as a processed food.

When that kind of list is used to make a case about plant dangers, the whole business is blown out of proportion with the result that plants in general are suspected of being poisonous.

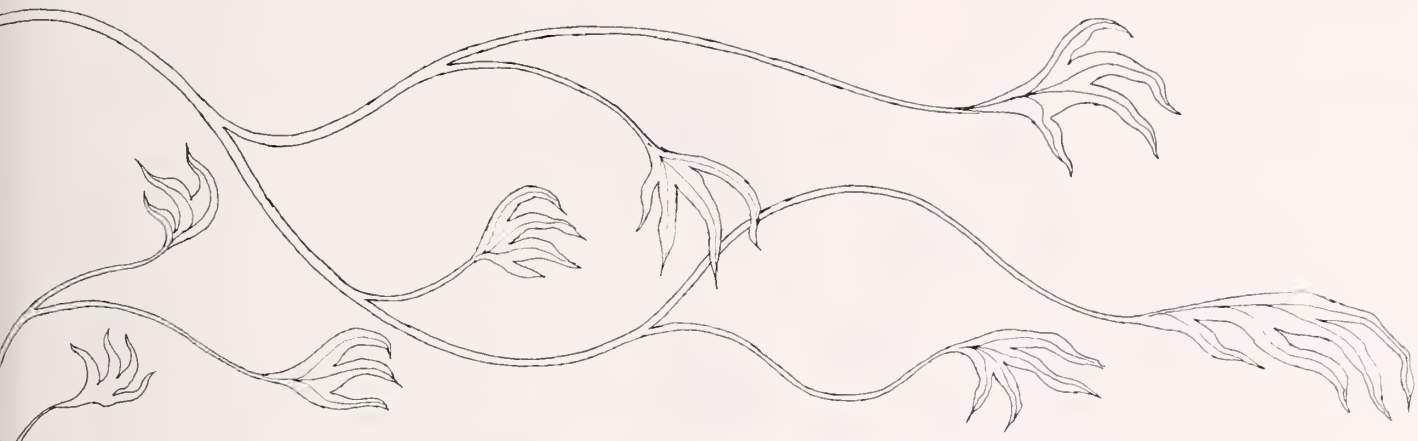
The National Clearinghouse reports a total of 4,308 cases of plant ingestion in 1970, and one-third of those were the kind of plants or products I've talked about that don't belong on a list of dangerous plants.

As I said, there were 4,308 cases reported by the Clearinghouse. 381 of them required treatment of one kind or another. That's 9% of the total, and that means 91% of the cases did not have treatment described in the report. 90 persons went to the hospital, 35 of them under five years old.

Two deaths were reported from the ingestion of plants. One of those was from an overdose of Peyote, an hallucinogenic drug that grows wild in the southwest. The other death was attributed to crab apple. Now, the medical authorities agree that crab apples, raw, in jelly, or in pies are perfectly safe and rather delicious, so we questioned the Clearinghouse on that one. Here's what they told us: "The 1970 death listed to crab apple was in error and due to a punching error." In other words, it was a clerical mistake. No death occurred. But just wait; soon you'll be reading lurid newspaper stories about the deadly crab apple which is striking down innocent victims! And when that happens, please remember it just ain't so.

pause for a mid-point summary

I've tried to make two points so far. One, there are a number of reckless



writers publishing frightening but false information based largely on what must be concluded to be an intentional misuse of statistics collected by the National Clearinghouse for Poison Control Centers.

Two, it's fairly easy to misuse those statistics if you want to, because the way they're put together needs some serious overhauling. I'm happy to report that, partially as a result of our investigations, the Clearinghouse is taking steps in that direction, particularly in the proper labeling of some of their charts and tables. For example, they have written to us saying, "'Type of Poisoning' on page 9 of the September-October 1971 Bulletin would be more accurately worded 'Type of product reported to be ingested'." That's good progress.

a third point

Now there's a third point to make. It is possible (and probably more profitable) to write half-truths or folklore stories for the sake of drama. Here's a sample.

One writer said, "Rhododendron contains a poison that has shown up in honey made by bees that visited the plant." He's right as far as he went. But what he *didn't* say is that the honey had such a vile taste no one could accidentally eat the large quantity needed to be harmful.

Another one wrote: "Many people have died merely from eating steaks that have been speared on oleander twigs and roasted over a fire." The leaves and wood of the oleander are not suitable for human consumption, and people have been made ill from using their branches as skewers. Avoid doing that. But we have not been able to find any record of anyone having been fatally poisoned in this way. Our conclusion, and that of the medical authorties we have researched, is that this is an old wives' tale. It makes a spine-tingling story for a certain type of writer, but there aren't facts to back it up.

the poinsettia story

And one of the most persistent old wives' tale of them all is finally being put to rest, I think. Two scientists at the Ohio State University have published the findings from an elaborate research study they made with poinsettias. You've heard or read about poinsettias, "Take a bite of a poinsettia leaf and you'll die."

Well, Robert Stone and W. J. Collins mixed batches of homogenized poinsettia parts and force-fed the mixture in large doses to 160 laboratory rats. (They had to force-feed the stuff because poinsettias really taste awful.)

What happened? Nothing. None of the rats threw up, or stopped eating, or got unromantic, or died.

In other words, their results coincided with those of other scientific investigators who have analyzed the whole plant and found the extracts to contain common plant sterols or triterpenes—none considered commonly toxic. And they are unable to find any *authenticated* record of a person dying from eating poinsettias.

With the new research report in his hands, the Director of the Division of Hazardous Substances and Poison Control at the Food and Drug Administration's Bureau of Product Safety has said: "We concur with the investigators that large doses of homogenate of the poinsettia plant are not toxic to the rat." And he says, ". . . to our knowledge the ingestion of small amounts of the poinsettia plant has not presented a serious health hazard."

John M. Kingsbury, perhaps the foremost writer on the subject, has informed Stone and Collins that he is modifying his public statements in accord with their findings about poinsettias.

And perhaps those popular writers who have a field day every Christmas season with their dire warnings about the prettiest holiday plant of them all will take a cue from the FDA and Dr. Kingsbury. I suppose it will take awhile.

positive action

What am I saying — that we should be unconcerned about poisoning from plants, or that the general public should not be informed on the subject? Not at all.

There are plants that are hazardous if they are used improperly. Some cause allergies. Some skin rashes. Some can cause death.

Some are found in the home environment, and everyone should know them. *Most* are found in the wilderness, and anyone going on an outing should be able to identify them.

the solution

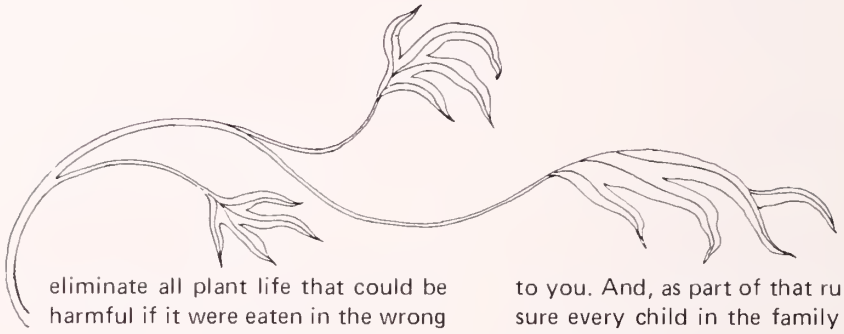
What is needed is accurate, reasonable and factual information, free of flaming words and alarmist phrases that some seeking recognition seem to enjoy using.

I want to suggest five steps that I think must be taken as protection against the danger that exists from those plants that are harmful. But first I want to say a word about a couple of ideas that have been encouraged by the sensational literature on the subject, ideas that deserve to be rejected.

two courses to be rejected

Now and then someone will propose that all plants identified as poisonous be outlawed and destroyed. This is just plain impractical. There is no way to

continued



eliminate all plant life that could be harmful if it were eaten in the wrong quantity or in the wrong way.

Because potato shoots or leaves can cause indigestion doesn't mean that we stop eating potatoes. The one death from plant poisoning recorded in 1969 was from eating rhubarb leaves, but that doesn't mean we should make rhubarb pie illegal.

Another suggestion has been that all plants with harmful potential be *labeled* with some kind of warning. In most cases, plants involved in reports of adverse effects are native plants that people come in contact with in the wild, and the task of labeling them is pretty ludicrous.

Even if a label were required to indicate that a plant may be hazardous, there is no assurance the label would be kept on a plant once it is added to the home landscape. The underground stems of the beautiful iris, for example, cause a digestive upset if they are eaten. It is unlikely that a label on an iris bulb would be kept on display after planting.

Another point. 73% of the reports of cases involving plants going through the National Clearinghouse in 1970 involved children under five years of age. That's an age when written instructions have very little value. It's an age when children are taught to stay out of the medicine cabinet, out of the street, out of electric sockets, and away from a long list of threatening things.

And that brings me to the positive steps I think are so important.

five protective steps

First, and this is the best rule of all. The effective way to deal with the problem of hazardous substances—*any* suspicious substances—is to avoid them. Just never eat anything that is unknown to you. And, as part of that rule, be sure every child in the family learns that same lesson.

Second: become familiar with the plants in your area, yard and home. Know them by name. Your retail nursery center or florist can help you identify those that could cause an adverse reation under certain circumstances, and it will be good to have the scientific name for them.

Third: if your children use any kind of seeds or fruits or stems as playthings or as skewers for meat or marshmallows, be sure you know what they are. If you're not sure, substitute them with something you recognize.

Fourth: avoid smoke from any burning substance, including plant material, unless you know exactly what it is and that it is harmless.

Fifth: in any case of suspected ingestion of an unknown substance call your doctor or the Poison Control Center. Be prepared, if at all possible, to give the name of the substance involved, and save any evidence that might help to identify it.

in conclusion

Some 700 plants have been identified as "poisonous"; but that means anything from a mild allergy to a severe indigestion or, in isolated cases, death if the wrong part of the wrong plant is eaten in the wrong way. Hysterical shouts and impetuous, ill-advised action are not the answer. Accurate information, given to the public in a properly prepared program of education, is.

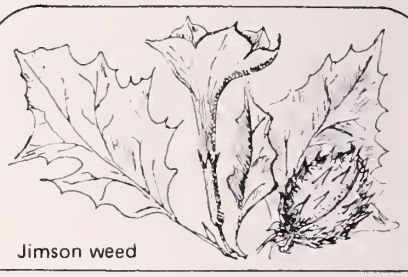
The men and women of the nursery and florist industries want every individual to be informed, so everyone can enjoy nature's bountiful growing gifts, in safety, without fear.

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For Information About Poison Control in Your Area

Philadelphia	215-922-5524 922-5523
Wilmington, Delaware	302-655-3389
North Jersey	
Newark	
Children's Hospital	201-484-8000 Ext. 419
Beth Israel Hospital	201-923-6000
South Jersey	
Camden	609-963-8830 Ext. 351
Maryland Regional	301-528-7701
Baltimore	
Johns Hopkins Hospital	301-955-5000
University of Maryland Hospital	301-528-2121

If these numbers are not geographically close, call your information operator and tell her/him that you want the Poison Control Center nearest you. Your cooperative extension agent also has an up-to-date list of emergency centers.



Jimson weed

checking poisonous plants

Three children were recently featured in the news when they were hospitalized after collecting and eating jimson weed, which is poisonous. PHS horticulturists Ed Lindemann and Jane Talarico say the biggest problem they have when someone calls is they can't give information unless the plant the person has eaten can be definitely identified. And even then, they can only say the plant is listed as toxic in one of the authoritative books used.* Lindemann says if the situation is a crisis he usually refers the caller to the Lankenau Hospital Poison Control Center (922-5523). Lindemann feels the best advice is to train children to eat only what they can positively identify as non-poisonous. If there is a problem, don't panic. Call the Poison Control Center nearest you.

**Plant Toxicity and Dermatitis* by Kenneth F. Lame and Rune Fagerstrom, Williams & Wilkins, Baltimore, Md. 1968

Poisonous Plants of United States and Canada by John M. Kingsbury, Prentice Hall, Inc., Englewood Cliffs, N.J., 1964



drawings by Doretta Klaber
for *Violets of the United States.*
Reproduced courtesy of A. S. Barnes & Co.,
Cranbury, N.J.

violets

VIOLETS OF THE UNITED STATES

by Alexander L. Crosby

Doretta Klaber lived an extraordinary life. Her basic belief was that she could do practically anything. And so it was quite in character for her to decide, when she was past 75, that she would write and illustrate a book to be called *Violets of the United States.* The only comparable book was Viola Brainerd Baird's *Wild Violets of North America,* printed in an edition of only 1,000 copies by the University of California Press in 1942.

continued

Alexander L. Crosby was a neighbor of Doretta Klaber for more than 10 years, and treasures the rock garden plants she gave to him and his wife. The Crosbys found a couple of violets for her book.

violets continued

Although not a graduate horticulturist, Klaber was far from unqualified for her task. She had operated a one-woman nursery for many years. She had written and illustrated three slender books, *Rock Garden Plants, Gentians for Your Garden,* and *Primroses and Spring.* And she had a store of energy that younger friends could seldom match.

Klaber's big, $40 book was published by A. S. Barnes and Company last June, two years after the author's death at the age of 86. Dr. Norman H. Russell of Central State University in Edmond, Oklahoma, who is the leading authority on violets, wrote in a foreword, "I believe that her drawings are entirely without equal in botanical works for their clarity, exactness and artistic quality."

No less remarkable than the drawings was the author's method of collecting specimens. She wrote to the departments of agriculture in all 50 states, to many botanical departments of state universities, to commercial nurseries that sell wild flowers, and to friends around the country. When Cleo Fitch of New York mentioned that she was going to visit her hometown, Nashville, Klaber knew what she wanted: a specimen of *Viola Egglestonii* (see illustration), which grows only in central Tennessee. "I begged her to try to find it for me. She did, and it arrived in excellent condition. What a thrill!"

Often the specimens were too battered to serve as models. They were promptly put into the garden, providing fresh plants and flowers the next sping. Scores of species were established in the rich earth of Klaber's wooded tract near Quaktertown, Pennsylvania.

Printed on 9¼ x 12¼ pages, *Violets of the United States* has 108 color plates on 80 pages, plus many drawings in black and white. Klaber relished detail, and was seldom content to make a single drawing of a species. For example, her illustrations of *Viola canadensis,* the Canadian white violet, show two plants, complete with roots, plus three details giving the back and side views of the blossoms. Baird's book has a single illustration for each species, done in watercolor by F. Schuyler Mathews. His work is excellent, but he was casual about roots, sometimes omitting them altogether.

Klaber had a host of friends, and it is not easy to determine which are people and which are plants.

To make identification easier, Klaber divides the violets into nine groups: by color (blue, white, yellow), by shape of leaf (uncut or cut), and by habit of growth (stemmed or stemless). She concedes that very few violets are blue, but what kind of rhyme could follow "Roses are red, violets are purple"?

Klaber describes 90 species and varieties, and Baird reports on 77 species. Klaber includes nine species not listed by Baird; the latter has 10 violets not described by Klaber. These tallies, based on a comparison of scientific names, are subject to correction, for changes in nomenclature since 1942 may have reduced the differences.

Most of the common names are the same in both books. For no reason except fun I picked out four violets with differing common names, the first from Baird, the second from Klaber:

	Baird	Klaber
V. conspersa	early pale blue violet	dog violet
V. fimbriatula	rattlesnake violet	northern downy violet
V. sempervirens	evergreen violet	redwood violet
V. sororia	woolly blue violet	dooryard or sister violet

I was sorry to see rattlesnake dropped, but at least we have gained a dog.

Knowledge of violets is spreading, and so are the violets. Baird wrote that the New England blue violet, *V. novae angliae,* was found only in the northern part of Maine. Klaber drew from specimens collected in New York and Minnesota.

A constant gardener, Klaber judged every violet as a possible addition to the garden. She encourages eastern readers to try *V. Howellii,* the Oregon coastal violet: "As it is deciduous, and thus gets some protection over the winter, it should thrive in other parts of the country in sun or half-shade." Similar counsel is given for many other species.

The text often reads like a conversation with the ebullient author. Klaber had a host of friends, and it is not easy to determine which are people and which are plants. Thus she refers to one "darling" violet and her johnny-jump-ups are "pets."

The appendix is valuable. Included are a list of five nurseries that offer some of the more unusual violets; a table showing geographical distribution (east, west, north, south); and another table showing positions found (sun, moist, places, and shade). The author notes: "Most violets will grow anywhere and you sometimes wish they wouldn't."

The book is dedicated to two men: Klaber's late husband, Eugene Henry Klaber, a distinguished architect; and Dr. Russell, who examined every drawing and read the manuscript for botanical accuracy. "Only he and I know how much I owe to him," the author wrote of Dr. Russell.

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pyracantha coccinea lalandi

You may have seen the plant. It's on the northeast corner of Third and Spruce Streets. It's trained flat against a high brick wall. There, a firethorn *(Pyracantha coccinea lalandi)* has been disciplined into the elegantly spare lines of a Modigliani painting. Last fall its dark green leaves were a perfect foil for the thousands of small orange berries that studded the branches. Even without berries, or the tiny white blossoms that precede them, the lines of lustrous evergreen foliage are handsome throughout the year and relieve the monotony of what its owner calls "a dumb old wall."

But how was the design achieved? Surely by a sculptor—an architect—someone trained in the art of landscape designs? Wrong! It was by a woman untrained in those skills, but with a wonderful enthusiasm for anything that grows. Nearly ten years ago she moved from a suburban home surrounded with shrubbery, peonies, roses, and other plants she loved. Of friends visiting her stark new brick home she made one request: "When you come, be sure to bring a bucket of earth, with worms in it!" And they brought buckets of earth with worms to help make the barren plot bloom.

Today, the garden is an oasis. A blue-green chamaecyparis feathers against one wall. *Styrax japonica* has grown large enough to cast shade, and wisteria twines its way along the walltops. There are grape hyacinths, daffodils, forget-me-nots and violets in the spring; butterflyweed *(Asclepias tuberosa),* beloved peonies growing in a wooden barrel, and a Southern clerodendrum come North; then marigolds, goldenrod for love of the lost countryside, even a tomato plant with a broom for support and basil "to keep it company." Columbine grows here, too, far from the Rocky Mountains where its seed formed. Water slithers down a copper cascade made by her school's handyman, reminiscent of one seen at the Villa d'Este. Dragonflies, bees, lightning bugs, robins, and mockingbirds have all found this haven. So, alas, has something that eats the precious marigolds that grew from seed ripened in gardens at Chartres.

And the pyracantha sculpture? "That's my personal toy." It was planted as a tiny thing (pyracanthas don't like to be moved as they get larger, you know) in a sidewalk opening where a bush had once been. At first, conventional fasteners were used to hold the branches close to the wall, but were found inadequate. Now, the firethorn is secured to screweyes for which holes were drilled in the brick and plugged. The pattern was formed, says the owner, by the way the branches seemed to want to go. Some went up long, and others stopped short. O.K., let them. Gradually new shoots were woven in with the old and tied in place. Shoots that wanted to go off at an angle were encouraged to do so, but always kept under control as the design literally grew. Never was it allowed to become ragged. New growth was watched carefully, and pinched every couple of weeks. Crotches were kept clear.

Sunday mornings are great for such jobs, early, before most people start to get about and there's little traffic. A stepladder isn't as much of a hazard then. Neither are passing dogs, and the fence around the base can be cleared of the night's soda and beer can deposits. Passers-by have been fascinated to watch the sculpture develop. It has inspired drawings and paintings, and photographs of it have gone as far away as California, Arizona, and Nottingham, England.

But a mystery has arisen. During the fall of 1975, the plant was covered with berries. In '76 there were scarcely any. "Why?" asks the sculptor. The answer may lie in the very quality that makes this plant so attractive—the constant attention to its growth. Most firethorn flowers come from the axils of leaves growing on branches formed the previous year. If those branches are kept too short or are not allowed to grow, few blossoms are likely to form.

continued

pyracantha continued

The Brooklyn Botanic Garden's new *Gardening Guide* comments, "Many gardeners feel there is really no good time to prune this plant" because unless it is allowed to grow freely, one must inevitably remove either flowering or fruiting wood. This year's growth will bear next year's fruit, and last year's is busy doing just that, so one must choose, but with discretion.

Perhaps the unusual 1976 spring frost may have come at a crucial time for the Spruce Street plant and destroyed incipient buds. Still another possibility lies in the inherent nature of this particular plant. The blooming, and hence fruiting, habit of a firethorn originating from seed can vary considerably from one individual to another. Pyracantha belongs to the rose family, as do apples. Certain apple varieties are notorious for being biennial bearers, setting fruit heavily one year and the next year building up energy for another effort the following year. Maybe that's what the Spruce Street sculpture is doing. Scab can reduce a firethorn's vigor, but a fungicide is applied regularly to this one to avoid such a misfortune.

The sculptor may know the real answer when she says, "The grace of God made it do what it did last year. I have a feeling it will do it again next year."

Barbara Hesse Emerson







Barbara Emerson majored in landscape design at Cornell University. She is a member of the PHS Executive Council, vice-president of the Council of Botanic and Horticultural Libraries and agricultural technical information coordinator for Amchem Products in Ambler.

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delphinium

Flowers selected for the border are determined by several factors, such as blooming time, color, length of blooming period, scale, and hardiness.

Some, however, are selected for their outstanding beauty, even though they may present some difficulty in cultivation.

The delphinium is one of these. The plants grow as high as seven feet, and range in color from pink through shades of blue to white, of many florets with large spurs on long flowered spikes.

I have always felt that delphinium is the queen of the perennial garden.

Is it a true perennial though? Not really. In my garden over the past 35 years there are always some that do not make it over winter.

They take care and attention all summer long. Feeding is done about



every two weeks with a fertilizer high in phosphorous, and they are watered on any sunny day if it has not rained on the day before. Full sun is necessary for maximum bloom, and they should be as protected as possible from the wind.

Staking is necessary, at least for the Pacific hybrids.

Twenty-four inches between the crowns is a minimum for spacing.

A thoroughly prepared soil bed is indispensible before you put in a plant. That means double ditching and augmenting the soil to make it cool and friable. In our case we have added and spaded in quantities of peat moss, gypsum and compost, in approximately equal parts.

Disease strikes delphinium, too, as well as mites, chewers, and fungus. Malathion, Kelthane and Benomyl seem to be the best answers, all of them, sometimes as frequently as once a week from late April through the summer.

So far, I have found no cure for crown rot.

The blooming period of delphinium is long. We have some flowers from mid-June until frost. In the main border after the first burst is over, by mid-July, the heads are cut off and in another month to six weeks secondary spikes appear, not as tall as the June ones, but very welcome in the late summer garden.

By selecting *Delphinium chinensis* for the front, Connecticut Yankee hybrids for the mid-ground, and Pacific hybrids for the back, a very pleasing arrangement is accomplished.

I start seeds, fresh seeds that is, in the coldframe about August first. Using your own seed requires stratification, some purchased seed has already been stratified. By October the seedlings are ready to transplant and are kept in the frames all winter. No fertilizer is used at this stage. They usually winter very well and are hardier than commercially grown plants purchased in the spring.

The distinctive style of the delphinium adds character to the perennial border in a way that few other plants can. Their display more than repays the care expended in their culture.

Mary L. Zimmerman

Mary L. Zimmerman is an irrepressible gardener. She says she's always had a perennial border, often larger than she and her husband found manageable. We called her the day after a bad storm and she said she had to make a great effort to become involved in another project to keep herself from going out to deadhead the phlox in the wet garden.





adlumia fungosa

I first encountered *Adlumia fungosa* last summer at Bowman's Hill Wildflower Preserve where it was growing nicely over a mountain laurel in full sun. The delicacy of the plant intrigued me and upon inquiring, I learned that it is a biennial vine that will climb up to 15 ft. in one season. Later, I saw it growing over a low "rabbit-proofing" fence in semi-shade and blooming profusely, and again, straight up a hemlock.

Botanically, it is a member of the Fumariaceae, the same family in which we find Dutchman's breeches, squirrel corn, and bleeding heart. The corolla is heart-shaped, white to pale pink, and the leaves are thrice-pinnate, thus giving it a filmy appearance. It is a gentle climber, using only the twining growth habit of its leafstalks to make its way.

The Allegheny vine is native to the mountainous regions of Pennsylvania, though it does very well in the Philadelphia area. I purchased seeds from Bowman's Hill last year for the Barnes Foundation, set two plants out in September and kept one in the coldframe. The plants that were set out emerged unharmed this spring, the third was planted this April, and all three are now doing beautifully. I expect the blooming period to extend through August, and then hope the plants will reseed themselves. There are no special soil requirements for this plant, and it appears to do well in sun or semi-shade.

If you wish to try something new in your wild garden, *Adlumia fungosa* is both attractive and unusual, and well worth the effort to grow.

Candace Black

Candace Black is a member of the staff at the Barnes Foundation Arboretum and is interested in the flora of this region.

digging for information



by Ed Lindemann

In looking back over the inquiries I received a year ago at this time, I find that the majority of them asked the same questions. Spider mites and wet roots led the house plant problems. Outdoor questions were about pruning, mulching and perennial care. Most of these questions deal with maintenance, an important factor in gardening.

mites and wet roots plague winter house plants

During the winter I receive more house plant specimens with red spider mite damage than with all other pest damage combined. Mites usually feed on the underside of the leaves causing a pale yellow or gray cast on the upper surface. The mites themselves are tiny and appear as red or black specks on the leaves. Small, cottony, white spider webs on the underside of the leaves is also a sign of mites.

The conditions inside most houses and apartments are conducive to the rapid breeding and survival of mites. Central heating systems cause the air to be warm and dry, exactly what the mites like. Misting with water, using pebble trays, providing a cool night temperature and washing the leaves occasionally all help to keep mites under control. If an infestation is bad, spray the plant with Kelthane.

The second biggest house plant problem during the winter months is wet roots. The problem of wet roots is usually caused either by overwatering or poor drainage.

The important thing to remember is to check each house plant before you water. Check how moist the soil is and notice if the container drains properly. People ask if they should water their plants twice a week or every other day and should they use a cup of water or a quart. It is impossible to set a precise time and quantity schedule. Each plant and container must be treated individually when it comes to watering.

If the soil is wet do not water. Poor drainage on the other hand is not always so easy to recognize. All plants should be grown in a container with a hole in the bottom. Often people tell me that they have put stones in the bottom of a container for drainage. If there is no hole, the water will still accumulate eventually. Another problem I run into is that people put a plant in an ordinary clay pot inside a decorative non-draining container. That is a good idea aesthetically, but remember that water draining out of the clay pot accumulates in the decorative pot and should be emptied often.

keep it clean

Some simple preventive winter maintenance will keep your plants healthier and you will be happier because you can prevent problems. Careful cleanup of outdoor areas should continue well into late November. Planting areas that were infected by a fungus the previous growing season should be carefully raked clean of any fallen leaves, flowers or seed pods. Many types of fungus disease will survive from fall to spring especially if the winter is a mild one. Black spot on roses, for example, may be greatly reduced by removing all of the fallen leaves from the bed and pruning out infected canes during late fall and early winter.

After the leaves have fallen is an excellent time to check deciduous trees, shrubs and vines for damaged limbs and branches. Winter is the best time to prune and shape shade trees because the plants are dormant and cut limbs are easier to handle when they are not in leaf.

Another garden maintenance procedure that I keep after all winter is the grooming of perennial beds. After the first killing frost I start removing stalks, leaves and flowerheads that appear dead, wilted or damaged. I go over the beds several times during the winter removing debris as it appears and resetting those plants that may have heaved when the ground froze and thawed.

Several hours spent pruning trees or shrubs or tidying up the perennial bed on a mild December day can give the dedicated gardener a psychological lift as well as helping to keep the plants healthier.

to mulch or not to mulch

If we were guaranteed a constant four-inch covering of snow in the ground all winter there would not be the controversy about whether to mulch or not. I don't think you can answer the question one way. Examine each section of your garden and notice the type of plant material, the type of soil and the exposure. Winter temperatures in the Delaware Valley area fluctuate a great deal and the soil surface is constantly freezing and thawing. The purpose of a winter mulch is to act as a layer of insulation and reduce rapid changes in temperature of the surface layer of soil. Shallow rooted plants are more susceptible to damage from rapid temperature change and freezing and thawing.

If you decide to mulch an area it is best to wait until the ground has had a hard freeze. The more porous the mulch the better because air spaces act as insulation. Salt hay, peat moss or leaves work equally well. I like to use leaves because they don't cost anything and are easy to work with. Make sure that the leaves you choose are the type that curl such as oak or beech.

Leaves that remain flat such as some maples and poplar will only mat and eventually form a crust rather than insulation. Ground cover will often have the same effect as mulch and is especially useful in areas that are permanently planted such as foundation plantings and shrub borders. In the perennial garden I have successfully used common thyme *(Thymus vulgaris)* as a ground cover around lilies. The thyme seems to provide enough winter protection.

To mulch or not to mulch, the decision is up to you. When you decide understand what a winter mulch should do. Choose the correct mulching material and use it where you feel it is needed.

suggested winter reading:

Garden in Your House
by Ernesta D. Ballard

How to Prune Almost Anything
by John Philip Baumgardt

All About the Perennial Garden
by Montague Free

The New Perennials Preferred
by Helen Van Pelt Wilson

●

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Orchid Hobbyists will enjoy the meetings of the Southeastern Pennsylvania Orchid Society held the second Wednesday of each month at 8:00 p.m. in Clothier Hall in the Bryn Mawr Hospital Nurses' Home. Beginners and advanced orchidists will find the programs interesting and informative. For information call MI 2-0878.

The Greater Philadelphia Orchid Society meets at 8:30 p.m. every 3rd Thursday at Merion Friends Activity Building, 615 Montgomery Ave., Merion. Visitors welcome. For information call 647-4939. September meeting on the 23rd.

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Coprinus comatus (shaggy-mane)
See story on page 14.



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THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

Volume 5, Number 3 Jan./Feb. 1977

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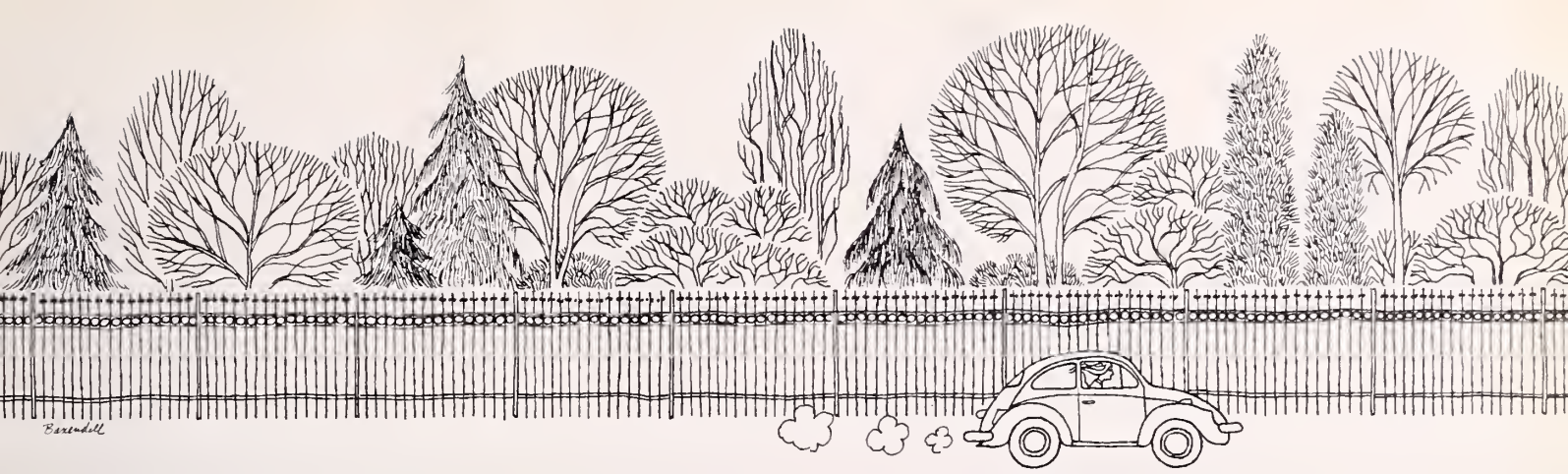
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Front Cover: Plimptons' greenhouse. See story on page 4. illustrations and photographs by F. T. P. Plimpton, Jr.

Back Cover: *Ginkgo biloba.* See story on page 22. photo by Clarence E. Lewis



An Arboretum? Why and What For?

An arboretum is a place where trees and shrubs are cultivated for scientific, educational and aesthetic purposes. Most arboretums are found in metropolitan areas; therefore, their primary concern should be with the role of trees and shrubs in the urban landscape. The arboretum's collections, educational programs, public service and research activities should reflect that commitment.

One can achieve a "Bicentennial Garden" overnight with red, white and blue petunias, but it takes 200 years to grow a Bicentennial tree. How many of the trees planted in 1976 will make it to their Centennial in 2076? A recent report indicates the average life span of newly planted city street trees is less than 20 years. Do we have to settle for that? Greater cost efficiency can be achieved in growing urban trees through wiser selection of species or cultivars, greater understanding of disease and insect control, more attention to site preparation, and care and feeding based on sound scientific principles and the needs of the tree.

The scope and quality of arboretum programs differ according to their location, physical and financial resources, the aspirations of the founders or trustees, the interests of the director and professional staff, and the needs of the community. Goals and objectives are not often clearly defined. In most cases the role of the arboretum is changing. It is emerging as a unifying force of diverse disciplines that are engaged in solving the vegetation management problems of the urban environment where most Americans live and work. Programs must be flexible to meet changing needs.

An arboretum is also a nice place to visit. A place of quiet beauty, where if you see a tree you like, it has a label so you can learn its name and place of origin. It should be a place to get answers to questions about trees whether you are a child, a student, a teacher, a park superintendent, a street commissioner, an arborist, a nurseryman, a landscape architect, a home owner, or a utility company executive. The answers are provided from visits, guided tours, classes, and consultations with the professional staff and volunteers. An arboretum offers unusual and personally rewarding opportunities for learning and community service for volunteers. In fact, no arboretum could exist without them.

Trees are a dominant component of the landscape and are essential to our environment. Trees must compete with other uses for land and are facing increasing difficulties because of the abuses and environmental pressures to which we subject them. Two priorities are essential if we are to have healthy trees and livable cities at the Tricentennial. They are: to learn more about the needs peculiar to trees in the city and to do everything possible to reduce the ecological stresses of the urban environment.

by Gordon A. Brandes

Gordon Brandes, a botanist, conservationist, and an authority on agricultural crop production and pest control, was formerly managing director of the Morris Arboretum. While director, Brandes initiated a public education program and developed innovative research to improve trees in the urban environment. Brandes is a Fellow of the American Phytopathological Society.

building your own greenhouse

A Gladwyne Greenhouse Starts It All



One of the hardest things about leaving the Delaware Valley area years ago was having to part with our greenhouse. But when we finally built another house a few years later, we set about it armed with a great deal of knowledge acquired in our first venture in Gladwyne. As a result, our second greenhouse is a distinct improvement.

Our house in Gladwyne was located in a small development of quarter acre lots. The previous owner had constructed a cement "slab" with footings below frost level. It extended along the entire rear of the house, which has a southeast exposure. He had intended to add another room. We built a 9 ft. x 13 ft. lean-to greenhouse. The door to the greenhouse opened off the dining room area and a second door opened onto the remaining portion of the slab, which served as a terrace and gave easy wheelbarrow access for soil and plants. The coldframes were close by. We gained some space by taking advantage of the extra width of the slab and extending the roof overhang by two feet. We then had enough room to put the terrace door on one side and storage shelves on the other. We built the wall in stuccoed cement block to match the house and included two vent windows. Roof ventilation was manually controlled, an inconvenience as we know so well today. Our heat was supplied by a "no-vent" gas heater, compatible in view of our use of gas for the house hot-air system. We found the cement flooring was a big drawback; it was easy to keep clean but created a constant battle to insure adequate humidity. We often had to use valuable bench space for potting and propagating. At least we had the shelf space to store fertilizers, insecticides and the like thanks to the extended roof overhang.

In retrospect we did the best we could, but lack of automatic vents and the constant loss of humidity made it difficult to be away for any length of time. Fortunately, our faithful housekeeper loved plants as much as we. When we were away, she wet down the cement with the hose and opened and closed the vents.

When we moved to Rhode Island we realized with horror that New England houses are not as generously supplied with deep windowsills as are the lovely stone-fronted Pennsylvania houses. We could not even "window garden" satisfactorily. Even so our love of the local colonial architecture prompted us to build a little gambrel-roofed farmhouse with plans for future expansion. Small-paned windows, wide board floors, ballast brick for fireplaces, doors, mantles, iron hardware collected from old houses were lovingly incorporated, but still no space for our dwindling plant collection.

expanding horticulturally

Five years later when we did expand the house, we expanded "horticulturally." Instead of adding a new living room and guest room as originally planned, we added a greenhouse and a potting shed; we designed both ourselves. This area has become the core of our living. It is here that our horticultural friends come to chat. Much of our work and studying is done in the potting shed, and all sorts of horticultural activities are carried out in both areas.

All through the design process, I kept thinking of my landscape design instructor at Ambler, James Bush-Brown. He would insist, in exercise after exercise, that we design the house first and then the landscape to suit. How aggravated we would be,

continued

by Susan W. Plimpton

Susan W. Plimpton, a horticulturist and landscape architect, has been practicing landscape architecture for 15 years. She was trained at the Ambler Campus of Temple University. She and her husband have their own partnership specializing in residential design. She has published numerous articles and teaches in the Extension Division of the Rhode Island School of Design. She has judged at the Boston and Philadelphia Spring Flower Shows. She and her husband, Francis T. P. Plimpton, Jr., make their home at Pojac Point, North Kingstown, Rhode Island.

greenhouse continued



Drawing A:
Sketch used in the design process helped us visualize how the addition would look. Potting shed is typical New England architecture. Greenhouse is not visible until almost alongside house. Compare with photo on page 8.

champing at the bit to get on with the planting, not fully appreciating, at that early stage, the essential closeness of structure and land. How wise he was.

The potting shed faces north towards the front, appearing as a small wing as you approach the house. In this way the greenhouse is obscured until one is almost abreast of the building. The greenhouse itself is tucked against the mudroom ell, which shields it from the living room terrace, because we feel that a greenhouse during the summer months is not at its most attractive. We knocked through an exterior kitchen closet wall to enter the potting shed and thence the greenhouse. We stayed with the lean-to concept because in Gladwyne we loved having the greenhouse as part of our house. It is the most natural thing in the world for us to go out into the greenhouse first thing in the morning.

Our favorite contractor, knowing our penchant for detail, came back to build our plans. Trim, plank door with strap hinges and other such features tied the new structure to the main house. Our design incorporated precise measurements of the sill and header for the greenhouse. Once the sill was ready, we erected the greenhouse ourselves as we had done in Gladwyne, but taking half the time. The first time up is the hardest in this operation.

Design of floor levels received careful attention. By setting the greenhouse floor at same as ground level, we could insure good drainage, yet retain moisture. We laid the floor using old brick in an attractive pattern set in sand and built a fish pool with fieldstone coping in the alcove against the mudroom ell.

The potting shed floor, two steps up, was poured in a cement surface easy to keep clean and dry, but a step down from the kitchen floor to minimize trailing soil into the house. We saved the weathered shingles from the old exterior wall for the wall area behind the pool; they gave a warm friendly feeling.

When the house was built our hot-water heating system had been sized to take care of expansion. So it was easy to provide one thermostat for the greenhouse and a separate one for the potting shed, which allows us to keep the plants in the potting shed at 60°F night temperature, while operating a "cool" greenhouse down to 50°F. An emergency kerosene burner has taken care of heating needs in the few times of power loss during winter. On one of these occasions, a winter night, the temperature alarm sounded in our bedroom to rouse us up to set up the emergency heating.

The automatic vents have given us excellent service. Only last year did we have to install our spare and send the disabled motor to be rebuilt. Our foundation vents open and close conveniently by cranks positioned at bench height, an improvement over having to reach under benches to operate levers.

We designed the potting shed with much thought. Our experience in Gladwyne had taught us that we could ill afford to sacrifice any greenhouse space for work area. We also wanted a separate propagating area in the potting shed, which we achieved by installing a fluorescent light setup complete with heating cables and automatic timer. A well-



Roof line of greenhouse and potting shed blends with gambrel roof of New England farmhouse. Cantilevered roof allows extra panel of glass on side.

lit potting bench with bins for soil, sand and peatmoss and adequate storage were two other requirements. We specified a sink deep enough to soak large pots and to facilitate cleanups.

One area of the potting shed serves as a small office. A five-foot long desk was built in with easy to clean formica top and file drawers. Shelves line the adjacent wall holding the most frequently used reference books and other records. The telephone has an extra long cord so we can carry on conversations while watering the greenhouse or checking the soup in the kitchen.

conservatory and laboratory

We also gave considerable thought to the greenhouse. One feature we had particularly enjoyed in Gladwyne was being able to sit in the greenhouse in the winter and to enjoy its warmth and surroundings. We didn't want to lose the conservatory atmosphere, and yet the demands of our work require adequate area to carry on plant experiments. We also need considerable space each spring to grow bedding plants for our greatly expanded flower and vegetable gardens. We had gone from a quarter acre in Gladwyne to more than two acres cleared out of a total of 16 acres at Maltesa Farm.

Our first decision was to choose the Orlyt Imperial model of aluminum greenhouse manufactured by Lord and Burnham. We liked the curved eaves and vertical front that fit well with our house and roof line. In fact the potting shed roof line blends with the greenhouse eaves to suggest the "saltbox" character of the addition.

We departed from the recommended construction of the greenhouse by taking the unused side glass panel from the west side and adding it to the east side, increasing usable space by some 30 inches. That gave us the nice asymmetrical "jog," which enabled us to leave in the mudroom window as well as a perfect area to incorporate the pool. The pool itself is surrounded by small ground beds in which we use potted plants, changing them with the season. Spring bulbs, forget-me-nots, pansies, primroses and small cinerarias all have been used in different combinations in the spring. The beds have been filled with fibrous rooted begonias and ferns. A small gentle stream of water can be turned on to cascade down the rocks at the back of the pool. Goldfish live in the pool at present, though we take special care when using insecticides near the water. From time to time different aquatics have been tried.

We like to leave the center floor space open most of the year so that we can bring in a table and terrace chairs for informal lunches. At the end of March, however, the greenhouse changes character. At this time of year our bedding plant production is in full swing. In order to accommodate all the material we need for outdoors, we bring in a portable center bench, which remains in place until mid-May. Thus our winter conservatory becomes our springtime production area to meet the busy schedule.

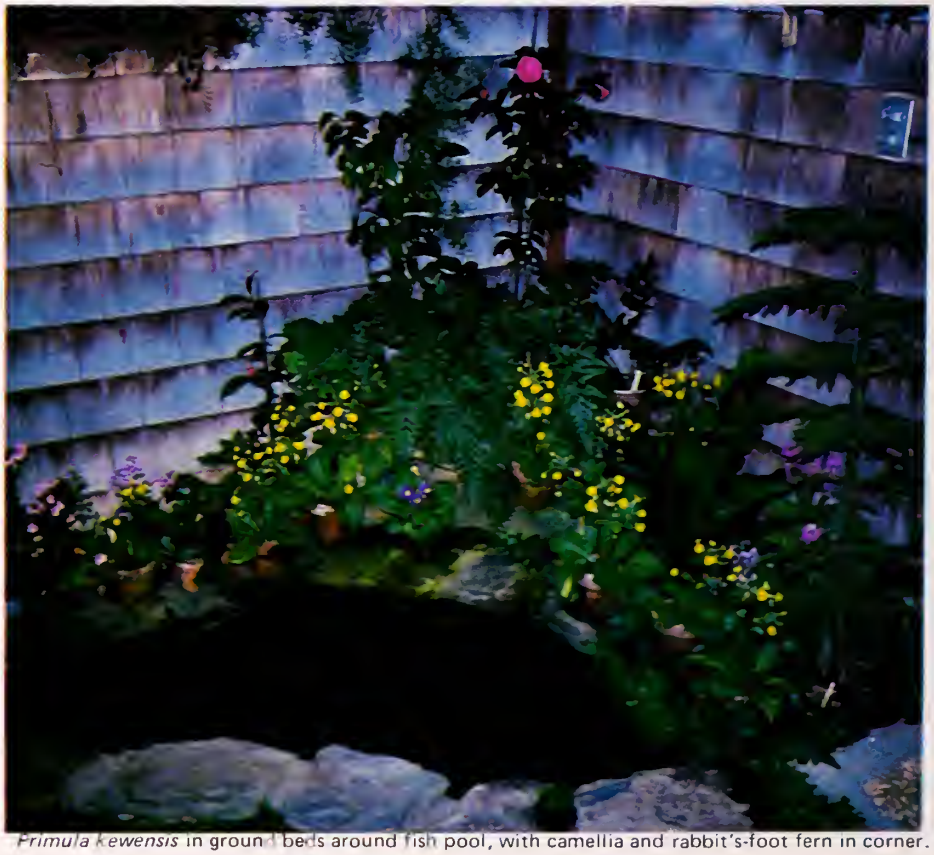
With night temperatures ranging

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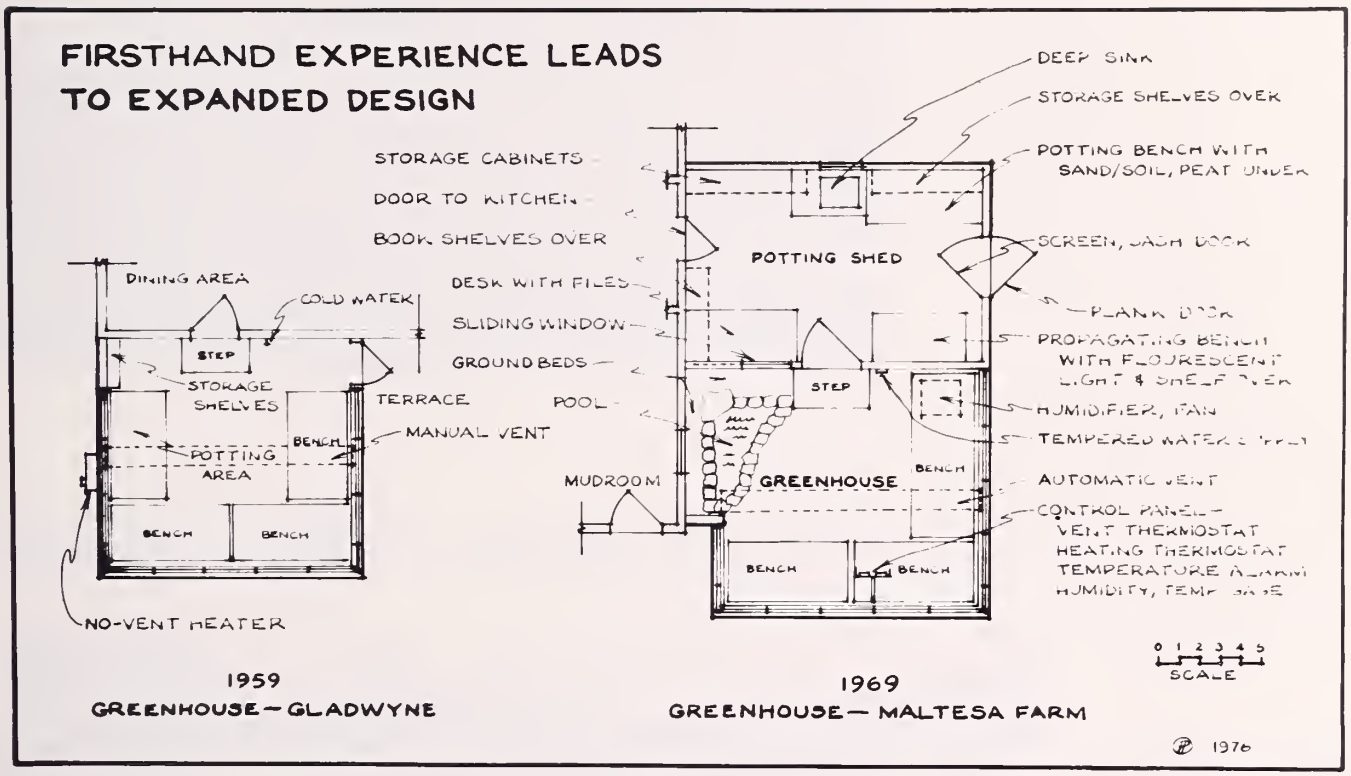
greenhouse continued



View from driveway.



Primula kewensis in ground beds around fish pool, with camellia and rabbit's-foot fern in corner.



Drawing B:
Our first greenhouse, in Gladwyne, (plan on the left) taught us many operating hints that led to expanded design with separate potting shed in our present facility in Rhode Island (plan on the right). Both greenhouses have the same width, but the new greenhouse yields greater overhead height, greater depth and more bench space for growing.

from 52° to 55° F, the main plant standbys are azaleas, camelias, clivia, cymbidiums and a handsome staghorn fern that grows on the wall over the pool. During the winter we force many pans of spring bulbs and each summer sow generous quantities of primroses and cinerarias. Geraniums, which are started from cuttings each July and carefully shaped all fall, begin blooming in earnest after the first of the year. Hundreds of other plants that do well in cool temperatures have been tried and we've kept records on each. This year a tiny plant of *Daphne odora* captivated all who experienced its fragrant bloom.

We particularly enjoy our winter greenhouse and like to open it for our neighbors in the middle of February when winter still has its bite and the spring flower shows have yet to come.

Depending on the weather, the bigger plants are moved outside for the summer, sometime in May. These pots are sunk in trenches 15 in. deep out under high oaks. The bottoms of the trenches are lined with gravel. Placing the pots in trenches avoids having them topple in high summery winds, and we find them least apt to dry out. The trenches, incidentally, double in the fall and winter as forcing pits for our bulbs, which are forced throughout the winter. These pans are brought into the greenhouse at three week intervals starting in January.

Only the smallest of pots are left inside because they dry out quickly and need constant attention. In midsummer the greenhouse receives a thorough cleaning. At this time the benches begin to fill quickly with tiny pots of rooted cuttings, primrose seedlings and others that must be started for winter bloom.

As fall approaches, the vacationing plants again find their places in the greenhouse. And so another year in the greenhouse begins its cycle. Each season brings new lessons, but we have seen this greenhouse meet our changing needs, thanks to our intimate experience of building our first greenhouse in Gladwyne.

●



photos by Edmund B. Gilchrist, Jr

Overall view of the Raden conifer collection before it was dismantled.

Oh Where, Oh Where,

by Lee Morris Raden

Lee M. Raden has moved to his new home, Alpine Flora, in Phoenixville, where he continues to specialize in high alpine plants and hummock gardening. (He promises an article on the subject.)

We all have a few traumatic experiences in our lives. Nothing in my life, however, quite equaled my recent problem. We had collected conifers in excess of 200 plants for almost 20 years. Many of them came into their own in beautiful maturity. The combination of greens, yellows and blues is a breathtaking spectacle at any time of the year. A collection of this scope and size is an ever-changing dynamic scene of spectacular trees. Architecturally the trees vary: some are stark, others are full of lace and plumes, and the weeping forms fight for your attention.

We left a home and garden that we personally created. It is enough of a logistical problem to move a family; add to that a plant collection that comprises one alpine house, one sun pit and the conifers. We panicked. The first thought was to sell them and make a lot of money; but certainly never sell the plants individually—sell the collection in its entirety. To us it's priceless, to any conifer collector it's priceless; but the world? Ah yes, where's the loot? — from our arboretums? — from our universities? — from city government? The money is not there to buy such a collection, and if it were, they probably would not have the wherewithall to maintain it. The search went on.

Then, we found out that Swiss Pines, in Charlestown, Chester County, Delaware Valley, would love to have the collection. So, we gave it to them and they donated a beautiful five-acre sloping site to house the collection. While we had carefully dug each hole and carefully planted each conifer, it dawned on us that while the conifers had gotten a lot larger, our backs had gotten a lot weaker.

continued



Have My Conifers Gone?



The Vermeer machine's apparatus encloses a conifer before digging out roots and all.



The teeth go into the ground and lift the tree out.



Dwarf conifers ready to go.



Arriving at Swiss Pines.

It was a neighbor, Dick Dietrick, who moved a large collection of tsuga a few years ago who provided the answer. Dick highly recommended Robert L. Hood, Jr. (Mechanical Tree Moving, Flourtown, Pa.). Bob and his son-in-law, Guy Irwin, came out to Chester Springs and agreed that with the help of the wonderful Vermeer machines, the collection could be dug and moved four miles to Swiss Pines.

Every plant in the collection had to be tagged with the correct botanical name. That was easy, but the logistical problem now took on an absolutely horrendous aspect. We had to make a map showing where each plant would be in the area allocated to us by Swiss Pines. The map was necessary because the Vermeer machines are large and the planting of the new area had to be specific for each plant so there would be no interference with the later plantings. It didn't take more than about 15 seconds before I realized I needed competent help to locate the plants so

continued



Digging out plug at Swiss Pines to fill hole back at Raden property.



The Vermeer holds the tree while worker waters the hole where it will be planted.

they would be pleasing aesthetically and would also be easy for the serious student of horticulture to study. Another consideration was that there would be enough room allowed the plants in the collection to grow and for the additional specimens we anticipate adding to the collection.

I have always felt that we have probably the most catholic group of gardeners in the American Rock Garden Society, and in particular, in the Delaware Valley Chapter. We found the expertise we needed for the design and map in Morris Berd and Claire Muller. They were wonderful in their enthusiasm to tackle the problem and help me. The result of their work is a lovely design with the conifers in six beds. They are not grouped as they generally are in a pinetum, by genus and species, instead they are placed for the overall effect of the conifers as you approach this garden from any one of a number of possible entrances. Both Swiss Pines and I were very grateful for a superb design job by both of these members of the American Rock Garden Society.

Now back to the Vermeers and Bob Hood Company. Each tree was not only named properly but it had another designation which was coded to place it on the site map. Stakes were prepared with the Latin name, the coded location, and the size of the tree, and these were placed at Swiss Pines. The total job involved the time of six people and covered four months.

We have a wonderful feeling about this new garden and we, at Swiss Pines, cordially invite the members of the Pennsylvania Horticultural Society, and their friends, to visit us in Charlestown.

Swiss Pines has set aside another five acres for additional conifers to add to the collection. Our goals are set; active participation by all people interested in dwarf and unusual conifers will give the Delaware Valley a wonderful chance to have the finest group of these plants in North America.

●

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Tree is planted.



A small area planted. This photo was taken immediately after trees were put in.



ABOUT COMMENTS

Editor's Note: Once upon a time not so long ago, in a city, not so different from Philadelphia, an enterprising tape recorder (brand and ownership unknown) recorded the following exchange, which was delivered to the PHS by an unidentified carrier pigeon. We print it here in the hope that it will lead to a solution of a problem many of us have not recognized heretofore — and may not recognize now.

First Voice (hereinafter called **CON** because the speaker seems to be against the established way of doing things): "Why should I go on entering my plants if some judge who doesn't know as much as I do about my entry is going to put me down with some inane remark about the way my plant looks or the kind of container it's growing in?"

Second Voice (hereinafter called **PRO** because the speaker seems generally sympathetic to the status quo): "But I like the comments; I learn from them. If I look at the flower arrangements, or the table settings, or the competitive gardens and see which one got the blue and the red, I usually can't figure out why. It's the comments that help me see how one is better than another."

CON: "OK, but you've picked out the best examples. I admit the comments are helpful in those classes, but they aren't always in most of the others. All they seem to do is hurt peoples' feelings. Why can't the judges restrict themselves to good, positive, helpful comments — we don't need any putdowns."

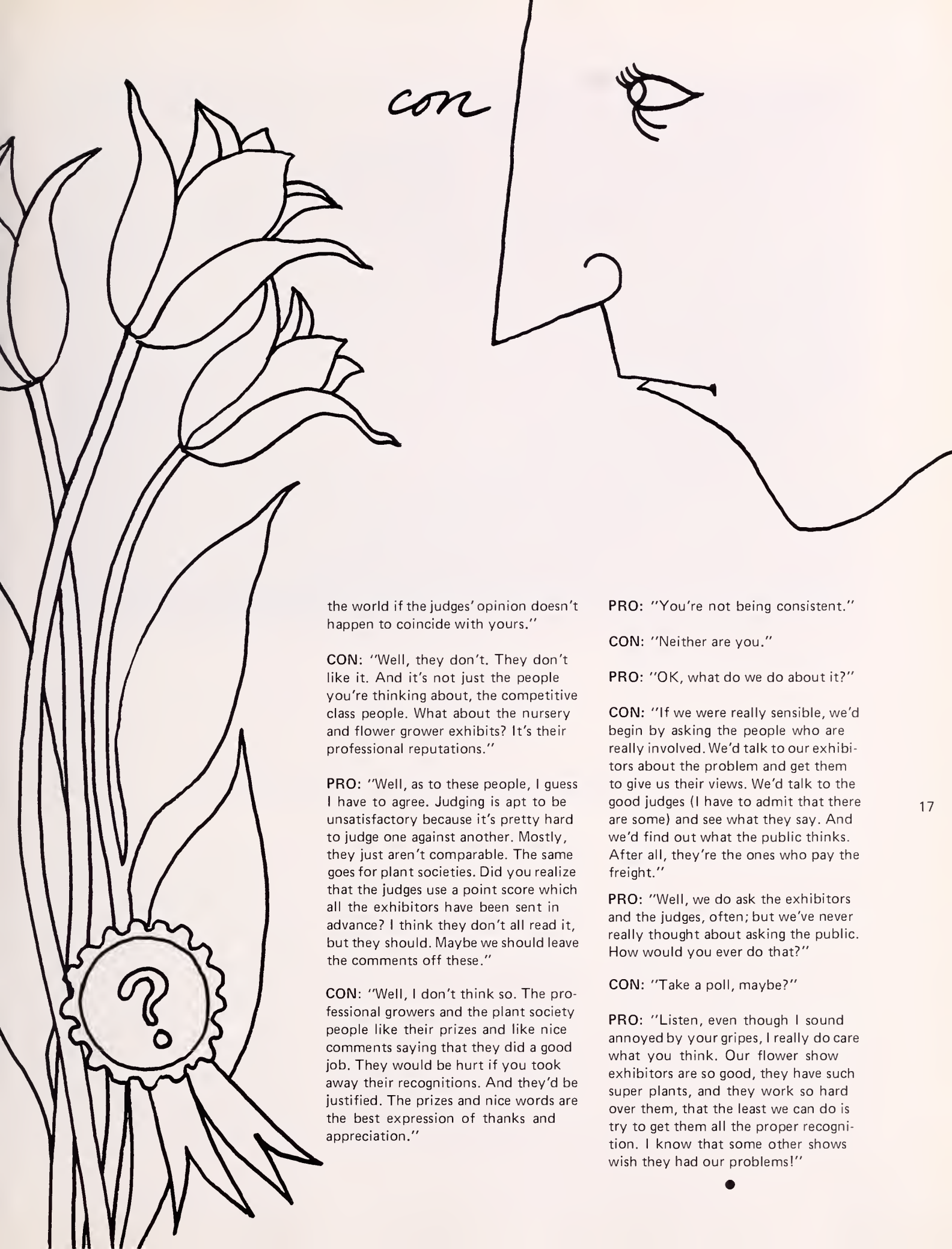
PRO: "Come on, you know better than that. If you make that rule, the comments sound like prune sizes, starting with 'giant' and moving up to 'jumbo,' 'colossal' and 'super colossal.' Maybe we should limit the comments to the best three entries so as to avoid hurt feelings."

CON: "Unh-unh, that won't work. That will hurt the feelings of the people who don't get comments even more. The way it is now, with the judges deciding who deserves a comment, the person who doesn't get one says, how can I improve if the judges won't tell me what's wrong. Or they say they are being discriminated against, or something. You've either got to get rid of the comments, or you've got to get good judges to write good comments on all the entries."

PRO: "Now it's my turn to say, wait a minute. We bring in judges from other cities so they will be impartial. We use panels of judges so as to avoid individual idiosyncrasies. We provide a clerk for each panel to write down their comments and a battery of people to type them up. The whole business involves dozens of judges and hours of judging time, not to mention some entertaining. Take it from me, we can't get better judges, and we can't allot time for more comments. I think the system works pretty well, and that we should leave it alone."

CON: "But why can't you at least get judges who know as much about the subject as I do? They do that in the plant society shows. And judges from out of town don't always understand our growing conditions."

PRO: "Well, the plant societies have rules and accreditation and it is a lot easier to say that one daffodil is better than another than it is to say that a blooming orange tree is better than a primrose. We just have to rely on the judgment of knowledgable horticulturists. The exhibitors are adults; they ought to realize that it's not the end of



the world if the judges' opinion doesn't happen to coincide with yours."

CON: "Well, they don't. They don't like it. And it's not just the people you're thinking about, the competitive class people. What about the nursery and flower grower exhibits? It's their professional reputations."

PRO: "Well, as to these people, I guess I have to agree. Judging is apt to be unsatisfactory because it's pretty hard to judge one against another. Mostly, they just aren't comparable. The same goes for plant societies. Did you realize that the judges use a point score which all the exhibitors have been sent in advance? I think they don't all read it, but they should. Maybe we should leave the comments off these."

CON: "Well, I don't think so. The professional growers and the plant society people like their prizes and like nice comments saying that they did a good job. They would be hurt if you took away their recognitions. And they'd be justified. The prizes and nice words are the best expression of thanks and appreciation."

PRO: "You're not being consistent."

CON: "Neither are you."

PRO: "OK, what do we do about it?"

CON: "If we were really sensible, we'd begin by asking the people who are really involved. We'd talk to our exhibitors about the problem and get them to give us their views. We'd talk to the good judges (I have to admit that there are some) and see what they say. And we'd find out what the public thinks. After all, they're the ones who pay the freight."

PRO: "Well, we do ask the exhibitors and the judges, often; but we've never really thought about asking the public. How would you ever do that?"

CON: "Take a poll, maybe?"

PRO: "Listen, even though I sound annoyed by your gripes, I really do care what you think. Our flower show exhibitors are so good, they have such super plants, and they work so hard over them, that the least we can do is try to get them all the proper recognition. I know that some other shows wish they had our problems!"

●



photos by John F. Gyer

An automatically watered squash patch.

Toward an Automatic Garden

by John F. Gyer

John Gyer is a chemical engineer in research at the New Jersey Mobil Oil laboratory. He has extended his interest in working with mechanical equipment to his gardening hobby.

I like vegetables, particularly when they come crisp and fresh from the garden to the table. But summer droughts and dry spells can turn new growth limp, and soon the garden begins to look tattered. To prevent the drying out, weeding and watering increase exponentially. I don't like such work, and I don't like weeds. Because I don't, the time and effort involved in maintaining a summer vegetable garden has driven me to experiment and to automate. I ultimately want a garden that, once set up, will care for itself until harvest.

Summer watering was the biggest chore but the most easily automated. I concluded after experimenting several years that an automatic garden watering system should:

1. give a constant moisture supply that can be adjusted for maximum growth;
2. put the water where plants need it—at their roots (the tubing is set down right alongside the plants and not in the middle of the rows where the water would promote weed growth and is wasted);
3. not require more water than the well or house system can supply;
4. accommodate changes in row spacing and garden layout;
5. be simple to automate, install, and lay by for the winter;
6. accept soluble fertilizer solutions.

These needs are best met by the techniques used commercially under the name "drip irrigation." Drip irrigation systems were first developed for use in arid climates like those of Israel or California's central valley. Since their development they have been used widely in greenhouse vegetable and flower production and in the field pro-

duction of fruit and vegetables throughout the country. My problem was to adapt these commercial techniques to our garden.

The most important part of a drip system is the apparatus for pressure and flow rate control. All drip systems operate at low pressure, 2 to 10 pounds per square inch (PSI). Normal household pressure, 20 to 50 PSI, would cause most drip tubing to burst if it were used in the system directly. The

I ultimately want a garden that, once set up, will care for itself until harvest.

apparatus I've found necessary to produce the needed pressure reduction and water cleanliness is outlined in Diagram 1. The apparatus includes: a shut-off valve, an in-line filter, a solenoid valve for automation, a throttling valve or a pressure reducing valve, and a pressure gauge. This apparatus constitutes the flow control station setup. A siphon type injector for soluble fertilizer is useful and worth the additional expense. A flow meter is handy in a large system to check for leaks or plugged drip tubes, but it is too expensive to be practical in most gardens.

The shut-off valve turns the system on and off manually to allow testing and repair of any breaks that may occur. An outdoor spigot at the side of the house or a little plastic hose valve is all that is needed. An electric solenoid valve like those used for automatic lawn sprinkler systems can be installed on the outlet side of the shut-off valve or used as the main shut-off itself. A solenoid is the key to automatic garden irrigation.



Automatic Pressure Regulator on Flow Control Station.

All drip systems let the low pressure water ooze through small holes in the tubes. Since stray dirt can clog these holes, only clean and filtered water should be used. The conical screen molded into a hose washer, which is sold in garden stores is good, but the screen size is a little coarse. An in-line filter which uses 150 - 200 mesh stainless steel screen is better.

The pressure reducing device can take a variety of forms. For a small garden, a simple throttling valve is a good investment. This valve has a narrow opening closed by a needle-like shaft so that very low flow rates can be set and maintained. In use, it is open just enough to produce the needed pressure after the system has filled. That setting can be locked, and the valve's operation is automatic from then on. For larger installation industrial pressure control valves are safe, simple, and effective, but expensive (see cost estimate chart).

continued

Diagram 1

Flow Control Station

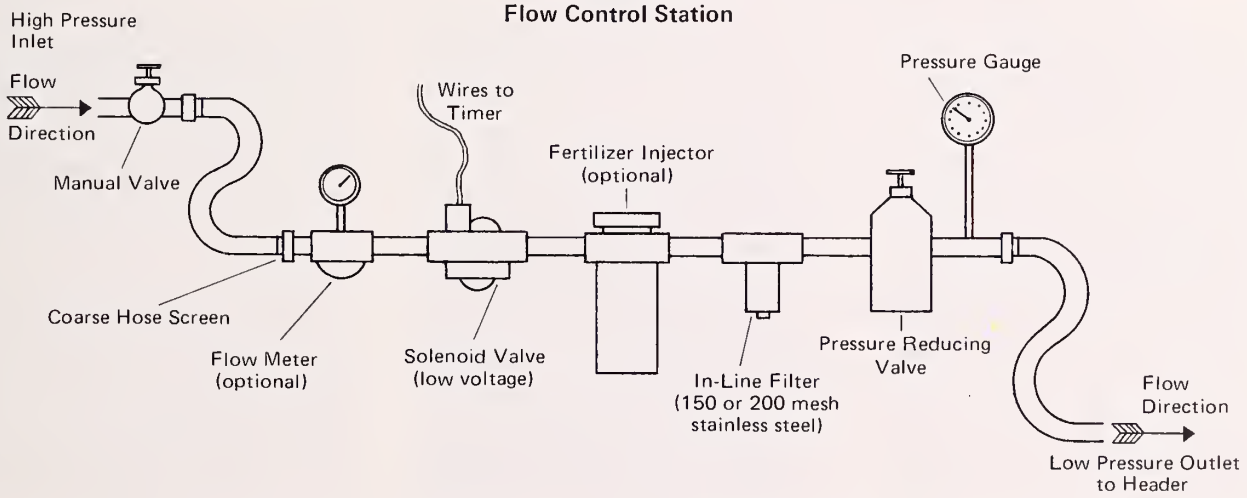


Diagram 2
Some Header and Drip Tube Connections

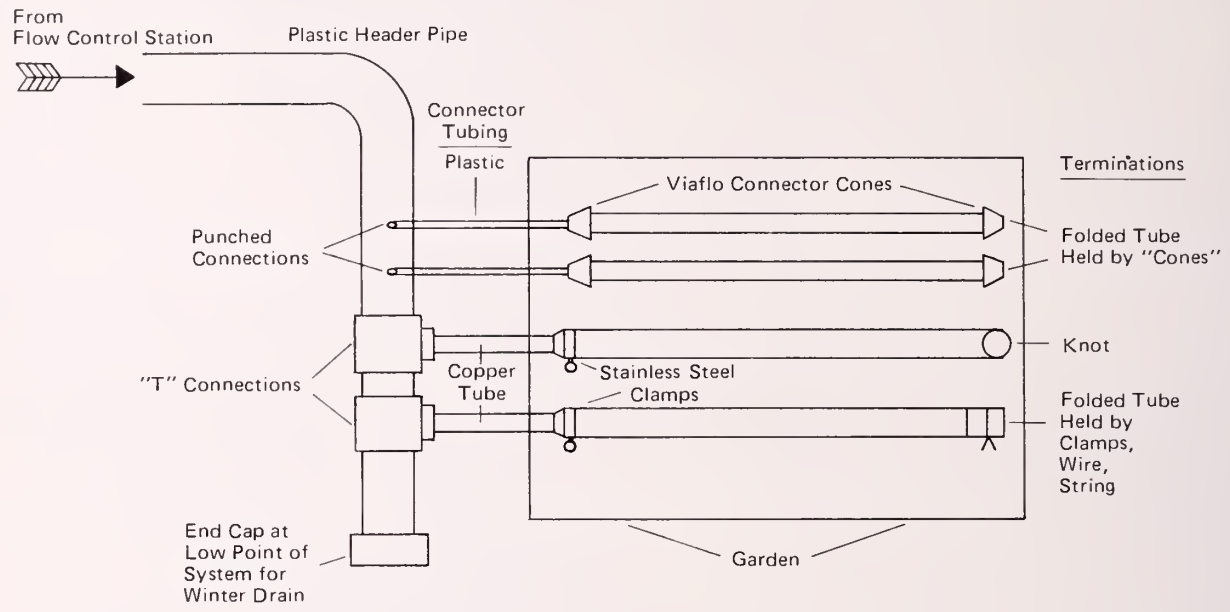
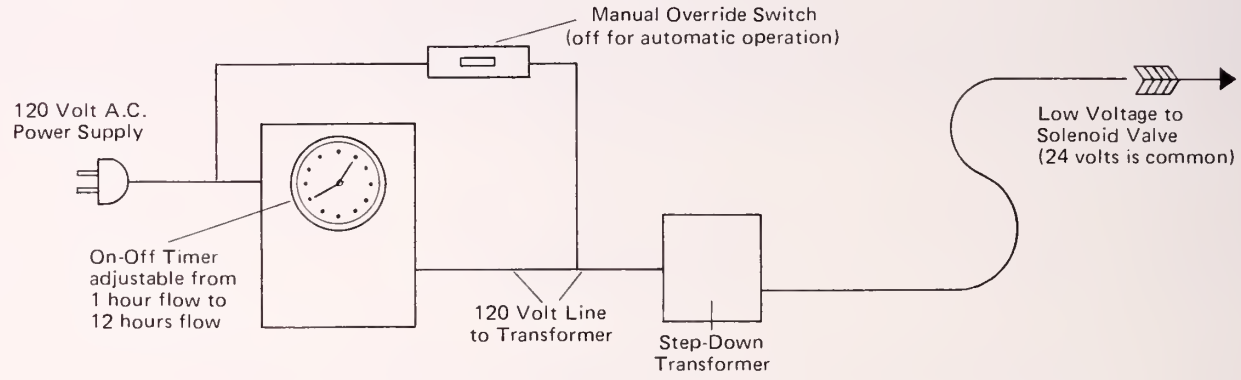


Diagram 3
Typical Timer Station



Pressure can also be safely controlled by a float valve in a tank on a raised platform. The elevation of the tank gives the needed pressure (2.3 ft. of elevation equals 1 PSI). The float valve maintains water flow. An elevated tank alone could be used as the water source in community gardens where a pressurized water supply is not available. Water is often carried into these gardens in plastic jugs and carefully dipped out to the thirsty plants. A drip irrigation line could help distribute this precious water more evenly. Water poured into an elevated tank at evening would provide enough pressure to irrigate the garden during the night when evaporation loss is low. This should give more even plant growth and free much of the gardener's time for weeding and harvesting.

In a pressurized system, a gauge that reads from 0 to 20 PSI is installed on the low pressure side of the pressure reducing device. This gauge tells that the system is operating effectively.

Drip tubing comes in several styles. I have found that the ooze type tubing (Viaflo from duPont) is ideal to use with vegetables grown with plastic mulch. A friend has had good results using Viaflo under a leaf mulch with vegetables, raspberries and strawberries. Viaflo is a porous plastic that feels like heavy paper. Water fills the tube and oozes as a dew through the pores. At 1.5 to 2 PSI the tubing sweats about one gallon per foot of length per day. Under plastic mulch in my sandy soil garden I have found that about two hours a day at 4 to 5 PSI gives excellent growth. Clay soils may require even less water.

Another type of drip tube is Twin-wall hose produced by Chapin Watermatics, Inc. I am now using it for raspberries. It is made from two layers of polyethylene tubing. The inner tube with widely spaced holes distributes water evenly into the outer tube. The closely spaced holes of the outer tube

drip water slowly onto the soil. Twin-wall hose operates at 6 to 10 PSI, a slightly higher pressure than Viaflo's 2 to 8 PSI. Twin-wall hose is black and will not support algae growth when it is exposed to sun. Unless Viaflo is covered with mulch or soil, algae tends to grow within the white plastic and plug its pores. Chlorinated water (1 to 3 parts per million chlorine) is said to minimize the problem. It is also said to keep insects from occasionally eating holes in the plastic tube.

A header or water main sketched in Diagram 2 carries low pressure water from the flow control station to the garden rows. Both Viaflo and Twin-wall are connected to this main through short lengths of plastic or copper tubes. Manufacturers have developed punches that make holes in the ½ in. or ¾ in. diameter plastic supply mains so that the connecting tubes can be slid into place. The resilience of the punctured pipe walls holds these tubes tightly. The connections are surprisingly leak free.

A more permanent installation places a "T" junction in the plastic header pipe. A reducing bushing connects the "T" to a 3/8 in. copper tube that is inserted into Viaflo and clamped in place with the stainless steel ring that is used on plastic pipe connections. This is a more rugged and durable system than the plastic tubes, but it is less flexible.

The header is laid out at right angles to the direction of the garden rows. One tube of either Viaflo or Twin-wall is run the length of each row and tied off at the end. Because of the low pressure a simple knot or a fold in the tube held by a compression fitting, wire or string is enough to prevent leaks. With this easy termination the system can accommodate rows of any length up to the flow rate controlled limit of the tubes. The maximum single row length is about 400 ft. for Viaflo and 200 ft. for Twin-wall. In my garden the system easily accommodates rows that vary from 25 ft. to 150 ft.

Shallow burial of the header and distribution system eliminates hoses snaking across the yard. Once done the system can be forgotten. Winter freezing is no problem if the lowest point can be opened to drain the system. For safety, however, the control valve should be brought indoors. Twin-wall hose can withstand freezing but if Viaflo is wet it may be damaged. Ice can form in its small pores and enlarge them so that the tubing may weaken. Because of this Viaflo is best stored in a dry place for the winter.

The system is automated by attaching a timer system to the solenoid valve used in the flow control station. Timers used for automatic lawn irrigation systems work well, but they often have a timing limit of one hour per valve per day. For drip systems longer times are often needed, particularly during hot dry spells. In these systems watering times must be increased to compensate for their low pressure and low flow rates.

If you like to tinker as well as garden, a useful timer system can be made from one of the on-off timers used for household lighting. In Diagram 3, the timer provides power to a small transformer that gives the relatively safe low voltage used by many lawn sprinkler valves. Such a small transformer should be available from an electric supply house that sells door chimes.

Fertilizer can be effectively applied through drip systems. A number of simple siphon type injectors can introduce soluble fertilizer directly into the irrigation water. Siphons are best installed in the high pressure line just upstream of the filter. Since fertilizer goes directly to the roots of the plant where it is used, small amounts produce large effects. This pinpoint application of soluble fertilizer minimizes relatively wasteful broadcast applications in the spring. This saving combined with the small volume of water used by drip irrigation reduces the annual energy consumed in a home garden.

Last year we let the garden tend itself while we were away on vacation. Growth continued while we were gone. Dr. Martin Pole Lima Beans gave a bumper crop and Illini Extra Sweet Corn was the best we have ever raised. DeCicco Broccoli bore throughout the summer and Ramapo Tomatoes produced loaded vines that climbed over the 6 ft. high wire supports. In fact, we were so pleased with the automatic vegetable garden system that we plan to extend it to our ornamental plantings next year.

Now, if I could only control weeds automatically. I wonder, would it work if . . . ? ? ?

●

EQUIPMENT SUPPLIERS

Submatic Irrigation Systems
P.O. Box 246
Lubbock, Texas 79408
Best selection of drip tubing, valves, timers, etc. Provides system design

Chapin Watermatics, Inc.
368 N. Colorado Avenue
Watertown, NY 13601
Originators of Twin-wall hose

E. C. Geiger
Box 285, Rt. 63
Harleysville, PA 19438
Sells drip tubing and some valves, mainly commercial.

you can estimate costs for drip irrigation

Viaflo tubing approximately 3¢ a ft.
Twin-wall hose approximately 1½¢ a ft.
Throttling valve $15 - $20
Industrial pressure regulator valve can range between $30 - $100. Mine cost about $70.
Filter $3 - $5
Pressure gauge $5 - $10
Solenoid valve depends on manufacturer and can range between $20 - $40.
Timers can run up to $200. If you can fiddle with it yourself, you can get one for $20.



Ginkgo biloba at Morris Arboretum.

The Ginkgo Tree:

A LIVING FOSSIL IN THE DELAWARE VALLEY

by Paul W. Meyer

After graduating from Ohio State University in 1973 in landscape horticulture, Paul Meyer spent a year working at Hillier's Nursery in England and in a commercial greenhouse in Germany. In August '76, he was appointed curator at the Morris Arboretum. Meyer is a graduate of the Longwood Graduate Program.



photo by Clarence E. Lewis

G. biloba leaves.

This is the original 'Fairmount' cultivar, which still stands at the corner of the site of the demolished Horticultural Hall in the Park. The tree was planted in 1876 for the Centennial celebration; it is from this tree that clones for the 'Fairmount' ginkgo are taken. ▼



photo by author

The ginkgo *(Ginkgo biloba)* is the sole surviving species of the family *Ginkgoaceae* which, some 180 million years ago, was distributed all over the world. Ginkgo leaf fossils have been found in a variety of locations ranging from the British Isles to Alaska. These fossils have been estimated to be 150 million years old indicating the genus *Ginkgo* preceded people on the earth by at least 249 million years.

As is true of many plants cultivated since antiquity, there is confusion as to whether the ginkgo is still living in the wild state in some Chinese forests. Some botanists contend that these wild trees are the offspring of those cultivated by man. It is true that the ginkgo has long been cultivated by the Chinese. Since they believed it was a sacred tree they often planted it on the sites of ancient temples and shrines. It is possible that these sacred trees provided the seeds disseminated to areas where the ginkgo now seems to be growing naturally. China was, however, the original source for all ginkgoes in the world today.

Besides being considered sacred in China, the ginkgo is the object of many Japanese superstitions. The Japanese believe this tree provides protection against fire by exuding water when scorched. In Japan a famous ginkgo is growing on the grave of Naikaku Koja, a Buddhist priest, who died around 700 A.D. She was the aunt of the emperor and wet nurse for his children. When she was about 80 years old and near death, she asked that a ginkgo be planted on her grave instead of a monument, thus enabling her soul to live on in the tree devoting itself to prayer for nurses.

When she died, the ginkgo was planted according to her wishes. After thriving for many years, the tree began to produce pendant growths said to resemble a woman's breasts. These growths are due to the abnormal development of dormant adventitious buds, which, upon reaching the ground, take root and bear leaves. This phenomenon does not commonly occur in the United States.

Since the legend of the Emperor's nurse was widely known, when these growths appeared the people began to call the ginkgo the nurse tree. In time, people began to worship the tree as the goddess of nurses and after 1,200 years they still visit and worship at the tree.

The name ginkgo was first applied to this species by the plant explorer Kaempfer when he first observed it in

continued

Ginkgo Tree continued



photo by Richard L. W. Reuss

John Swartley, former chairman of the department of horticulture at Temple University, Ambler Campus, stands before a 100 year gingko in front of the Montgomery Arms in Wynnewood.

1690. The Chinese word "gin" means "silver" and Kaempfer thought ginkgo meant "silver apricot." A more literal translation of ginkgo would be "silver-fruited." The specific epithet "biloba" refers to the fact that most leaves are divided in half by a small V-shaped depression.

Ginkgo is one of the few deciduous gymnosperms.* Thus, the ginkgo is more closely related to the needle conifers than the broad-leaved angiosperms. Its fan-shaped leaf with parallel venation is unlike that of any other living tree. Despite differences in foliage, the ginkgo was once classified with the yew in the yew family. About 40 years ago it was discovered that the male sex cells of ginkgo are free-swimming bodies of relatively gigantic size. The fact that they are equipped with many lashing cilia contrasts with the small passive male nuclei of the conifers. These were the last vestiges of a time when the male gametes had to traverse a watery gap to reach the female sex cells. That discovery led to the establishment of a new order, the ginkgoales, which isolated the genus of naked seeded plants.

The seeds are highly valued in the commerce of China and Japan. They are eaten roasted at feasts and are supposed to aid digestion and "diminish the effects of wine."

Probably the first ginkgoes to come into the country were three imported by William Hamilton in 1784. Two of these were planted at his Woodlands estate, which is now Woodlands Cemetery in West Philadelphia. The third was planted in John Bartram's Garden where it still thrives. Around 1800, another ginkgo was planted in the Peirce's Park area of what is now Longwood Gardens. The Peirce's Park ginkgo was considered noteworthy as early as 1853 when Thomas Meehan described it in his *American Handbook of Ornamental Trees.* He wrote, "There are some fine specimens of this tree in Mr. Peirce's arboretum little if any inferior to the Bartram specimen." Other mature ginkgoes, though of lesser historic importance, can be seen at Tyler and Morris Arboretums.

In the landscape the ginkgo generally grows up to 100 ft. in height. It is usually somewhat conical and sparsely branched when young, spreading more and becoming denser with age. The branches produce many short shoots, which produce clusters of leaves along with the reproductive structures. The male and female flowers are borne on separate trees. The female form is considered undesirable in the landscape because it gives off a rancid odor when the "fruits" are crushed after falling from the tree in the autumn. Since there is no way to differentiate males from females when they are young, most trees are propagated by grafting scions from a known male tree onto seedling roots.

Ginkgo wood is light, brittle and yellowish in color and has little commercial value. In the Orient it is used for chess boards, chess pieces, chopping blocks and firewood. The seeds are highly valued in the commerce of China and Japan. They are eaten roasted at feasts and are supposed to aid digestion and "diminish the effects of wine." The main economic importance of ginkgo today lies in its use as an ornamental. It is becoming more popular because it tolerates adverse city conditions and resists most insect and disease problems.

Many male cultivars are now being propagated by grafting to insure uniformity of habit. Several of the more widely used cultivars are:

- 'Autumn Gold,' known for its compact growth and brilliant yellow fall color
- 'Sentry,' with narrow upright form
- 'Lakeview,' which has a tight, compact, conical habit
- 'Fairmount,' a pyramidal, strong, straight tree with a rich gold fall color, originating from a Fairmount Park seedling. (See photo on page 24.)
- 'Pendula,' with somewhat dropping branches

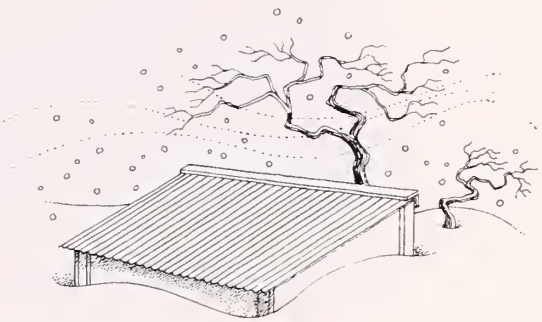
One problem with ginkgoes is that they are slow to establish after they are transplanted. The problem can be partially overcome by transplanting into a hole much larger than the tree's soil ball and then backfilling the extra space with liberal quantities of organic matter. Fertilization also helps. Once established, however, a ginkgo will become a beautiful, long-lasting, carefree specimen.

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*Gymnosperms are a class that include pine, spruce, cedar, etc. Gymnosperms usually have ovules borne on scales, usually in cones and lack true vessels in the woody tissue. In angiosperms the seed is included in an ovary; angiosperms include all of the flowering plants.

NOW IS THE TIME FOR ALL COLDFRAMES TO COME TO THE AID OF GARDENERS

by Joanna and George Reed



what is a coldframe

The Standard Cyclopedia of Horticulture edited by Liberty Hyde Bailey (Volume I) defines coldframes as unheated covered frames used:

- to start plants in spring before settled weather but not so early as in a hotbed;
- to receive plants from a hotbed or greenhouse holding them as an intermediate station until they go into the field;
- to carry hardy plants over the winter; e.g., spinach or lettuce;
- to store hardy or semi-hardy plants from greenhouse and garden;
- to provide a propagating bed in spring and summer for seeds or cuttings.

"Usually the coldframe is topped with glass as is the hotbed, but paper or cloth is sometimes used. Coldframes are usually of temporary construction."

At Longview Farm we have many uses for our eight coldframes. Several are large and permanently placed, and three are like those described in the second half of this article. The wooden ones are easily reached from all sides and are small and light enough to be moved from place to place in your garden as required.

In these coldframes we sow the seed that we buy, collect or that is given to us. Annuals needing an early start are sown directly in the frame. When they are moved into the garden, we put in perennials, which have germinated from seed sown the previous summer, late fall or early spring. Perennials develop so slowly they require the added protection and shelter of the coldframe.

We alternate the rows of the slow growers with the more vigorous types. When the vigorous plants are moved the slow growers have more room to develop. Some of these plants will remain in a frame for two or three years before we transplant them permanently in the garden. The frame is an ideal place for planting rare shrub or tree seeds, which are slow to germinate. I suggest making a chart as well as marking everything; last year the birds pulled out our markers leaving some confusion behind.

We use our frames throughout the year when we propagate by division. Plants divided in the spring are ready for the garden by early fall; summer and fall divisions will be ready for spring planting. Those divisions made in late fall can be set in permanent positions by early summer. Using a coldframe might not seem necessary when dividing, but we find we can make smaller and thus more divisions from a single plant. Your watering and shade can also be more carefully controlled. Dividing is an especially easy way to renew aging stock or to acquire enough material for mass plantings and naturalizing.

We work to fill two of the frames each fall with groundcover such as epimedium or sarcococca. When setting out the hundred or more plants of each species the following summer, we are annually assured that the initial work and trouble for an extra frame was certainly worthwhile.

It is simple to construct one of these frames in the ideal spot for cuttings, near a source of water with partial shade and prepared especially with a medium suitable for cuttings. They can be taken from midsummer on and left in the frames until planting time the following spring.

Doubtfully hardy species are wintered over in the frames, small divisions of each such variety are set into the frame and labeled; parent plants are left in the garden but if the winter proved unduly severe we have the nucleus for another start.

Newly acquired plants if small or unfamiliar to us are kept in a frame until large enough to divide, and we have become better acquainted with their habits and preferences. Naturally, a deep or taprooted plant would not be handled in the same way.

A few tips to remember:

- An occasional watering during the winter will be necessary. Water on a warm day.
- Keep well-ventilated. You don't want tender new growth developing too early in the season.
- If your planting is in flats or pots set it on cinders for drainage and to discourage slugs. Also check more often about watering.
- Keep taller growing material in the rear. Your shadiest area will be in the front rows.
- Above all move your material out of the frames before it becomes too large.

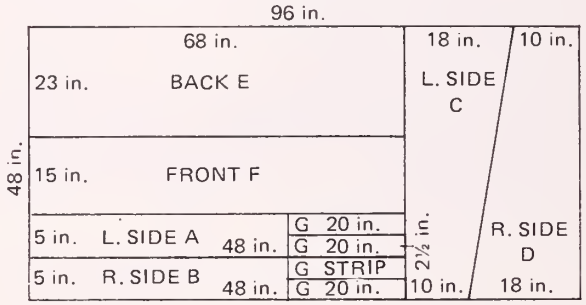
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PERMANENT COLDFRAME

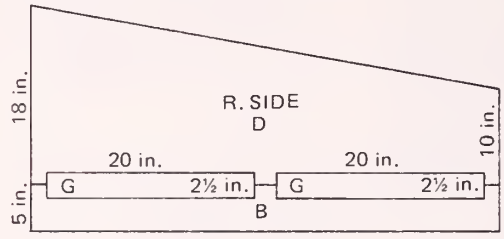
Materials Needed

1 piece of: exterior plywood 4 ft. x 8 ft. x ¾ in.
3 pieces of: 1 in. x 3 in. x 6 ft. Trim to length at assembly.
1 piece of: 2 in. x 3 in. x 8 ft. Cut into four pieces (2 pieces 28 in. long, 2 pieces 20 in. long)
3 pieces of: corrugated fiberglass 2 ft. x 4 ft. (1 piece 12 ft. long cut into 3 sections at mill)
2 sets of: screw eyes and hooks

(1) Exterior Plywood 4 ft. x 8 ft. x ¾ in.
Layout for Coldframe (nothing is wasted)



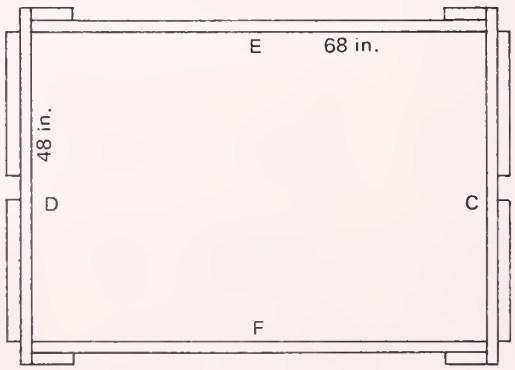
(2) Use 20 in. strips to join sections A + C and B + D to form sides of coldframe.



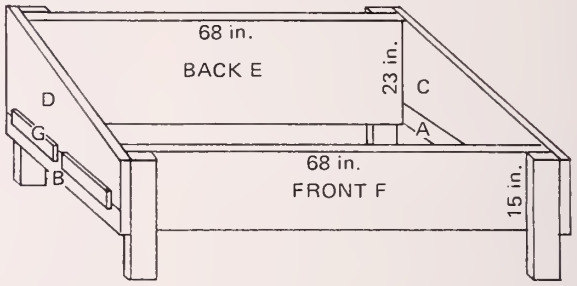
(3) Attach two 28-in. legs to ends of E and 20-in. legs to ends of F keeping 3-in. sides flush with plywood.



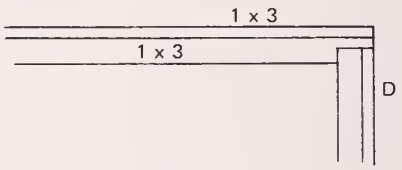
(4) Attach E + F to prefabricated sides of frame keeping the inside of box free of posts and joining strips.



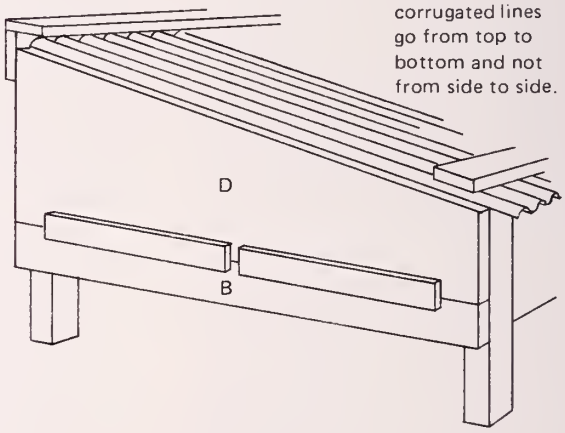
(5) Box will look like this when front, back and sides are joined.



(6) Attach 1 in. x 3 in. to back of box as shown. Notch back piece to clear 2 in. x 3 in. legs. All three pieces of 1 in. x 3 in. should be trimmed to 68 in.



(7) Use one strip of 1 In. x 3 in. to form slot for fiberglass cover wide enough for corrugated grooves to fit snug enough to be secure. Use last strip of 1 in. x 3 in. to hold other end of fiberglass in place. Use 2 hooks and eyes for fasteners.



We found, however, in windy weather a rock placed across ends of this strip and corners was needed to hold cover in place.

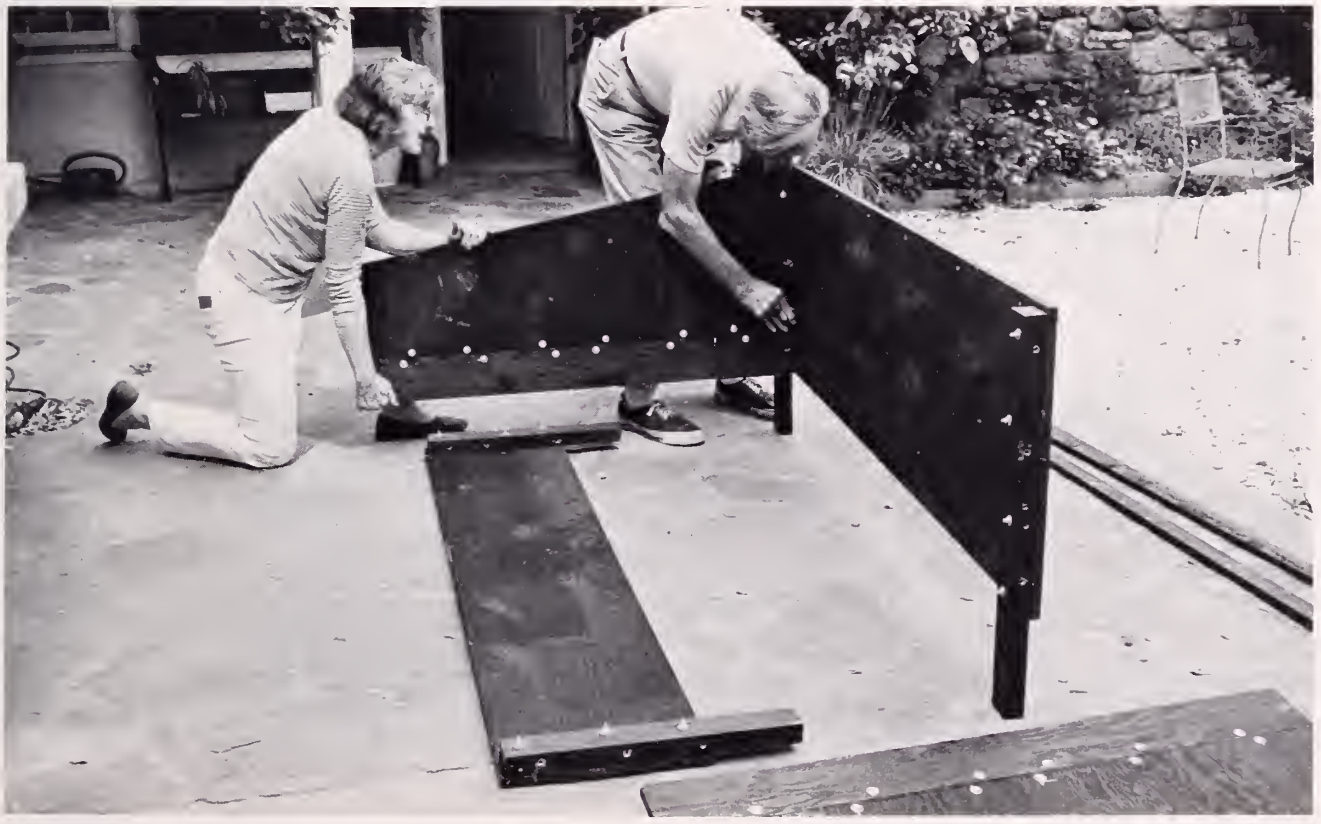
Coldframe designed by Joanna and George Reed

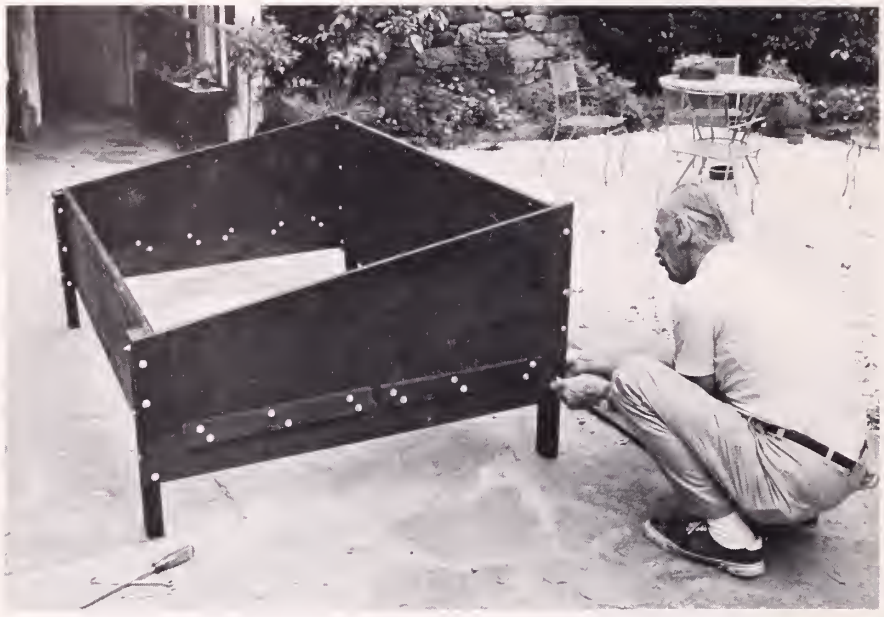
Here is a simple, easy-to-make inexpensive coldframe. It can be made from one sheet of exterior plywood, 4 ft. x 8 ft. x ¾ in. in thickness, with absolutely no waste. When the pieces are cut they should be treated with wood preservative; fill any voids with wood putty and then paint with outdoor paint.



Pieces cut from 4 ft. x 8 ft. exterior plywood sheet.

George and Joanna Reed attach end to back.

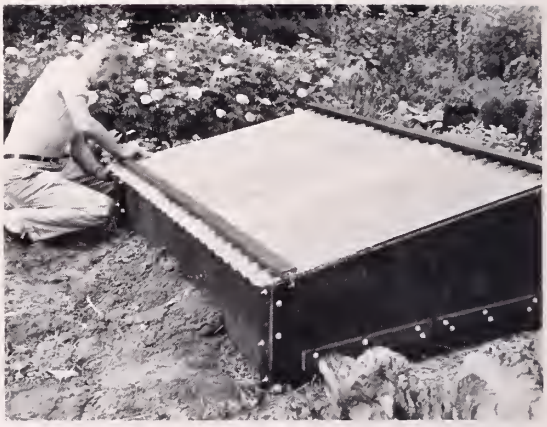




Above, author attaches last assembled end or side piece.

At right, George Reed fastens loose end of fiberglass with third strip of 1 in. x 3 in. x 68 in. to box using hooks and eyes.

Below, his labors done, George watches while Joanna mounds earth around outside of box. In winter corn stalks and leaves are added for insulation.





New World Plants in Old World Books

Hot news in the 16th and 17th Centuries

Exploration of the new world and descriptions of some of its plant treasures, corn, tobacco and potatoes, were "hot news" in the 16th and 17th centuries. Decades passed before information about them appeared in print. Exploration of another new world, Mars, began in the summer of '76. Nineteen minutes elapsed between the time Viking I touched the Martian surface, and we on earth learned of that event 212 million miles away. Soil testing for signs of life on Mars was not only a published, but an illustrated event within days. I wonder if records of Martian exploration will survive as successfully or as elegantly for students in future centuries as our old world books have for us.

I realized while working with the PHS Rare Book Collection last summer that PHS owns the very books that first announced the discovery of the new world plants to the old world. Descriptions of corn, tobacco, cocoa, potatoes, peppers, squash, and beans, all heavyweights in economic history and credited by scholars as originating in the new world, abound in the beautifully printed and illustrated volumes.

The most colorful account, *Joyfull Newes Out of the Newe Founde Worlde,* was written by Nicholas Monardes, a Spanish physician, in 1577. His translator, John Frampton, gave it that title because he believed that each curious new plant arriving in Spain from the new world, and described by Monardes, held promise for man in curing his diseases or hungers.

Monardes's account came 65 years after Columbus initiated the parade of seeds, fruits and dried plants coming from the new world to the old when he laid his offerings at the feet of Queen Isabella. It was left to the scholar-botanists of the 16th and 17th centuries to describe these prizes and to fit them into the botanical knowledge of the times.

Since these systems of botanical knowledge predated the Linnaean System we use, working with these beautiful old books meant wrestling with primitive plant names, Latin texts or archaic English. My initial encounter was with the 1542 Latin herbal of Fuchs', *De historia stirpium.* In it I found that *Tvrcicvm Frvmentvm* was corn, with a beautiful woodcut to prove it. Fuchs, writing in Germany, believed the plant (illus. 1) had come from Tur-

continued

Corn.



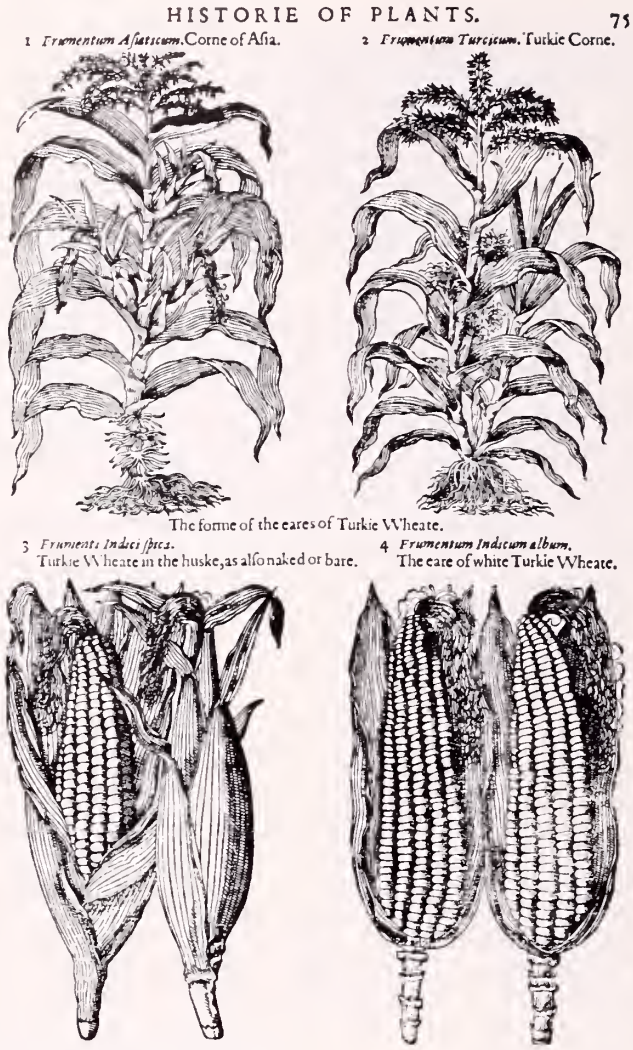
Leonhard Fuchs, *De historia stirpium,* 1542.

by Mary Lou Wolfe

Mary Lou Wolfe received her graduate degree in library science from Villanova University. Subsequently she studied rare book librarianship under Howell Heaney at the Drexel School of Library Science. She is also a graduate of the Arboretum of the Barnes Foundation. Wolfe is now the horticultural librarian at PHS.

New World Plants continued

Turkish Wheate. (Corn)



John Gerard, *Herball,* 1597.

Tobacco.



Peter Pena and Mathia de L'Obel, *Nova stirpium adversaria,* 1576.



Gerard holding potato plant.

key, hence the name *Tvrcicvm Frvmentum* or Turkish wheat. Actually, corn had been brought from the new world to Seville in 1500. By 1597, John Gerard, in his *Herbal* gives us a more familiar representation (illus. 2) and says: "In English it is called Turky corne and Turky wheate: the inhabitants of America and the Ilandes [adjoining], as also the east and west Indies, do call it Maizium and Mais. The bread which is made thereof is meanly white, without bran: it is hard and drie as bisket is, and hath in it no clammines at all: for which cause it is of hard digestion, and yeeldeth to the body little or no nourishment, it slowly descendeth and bindeth the belly, as that doth which is made of mill or Panick. We have as yet no certaine proofe or experience concerning the vertues of this kinde of corne, although the barbarous Indians which know no better, are constrained to make a vertue of necessitie, and think it a good food; whereas we may easily [judge] that it nourisheth but little, and is of hard and [evil] digestion, a more convenient foode for swine than for men." Surely no ships were launched inspired by this description.

By 1576 the first published illustration of tobacco, *Nicotiana Tabacum,* appeared in the *Nova stirpium adversaria* of Peter Pena and Mathia de L'Obel (illus. 3). It is from the accounts of the Spanish physician Monardes (mentioned earlier), in his 1577 *Joyfull Newes,* that we get this account: "The Indians of our Occidentall Indias, doeth use of the Tabacco for to take awaie the wearines, and for to take lightsomnesse of their laboure, which in their Daunces, thei bee so muche wearied, thei remaine so wearie, that thei can scarcely stirre: and because that thei maie laboure the next daie, and retourne to doe the foolishe exercise, thei doe take at the mouthe and nose, the smoke of the Tabaco, and thei remaine as dedde people, and beeyng so, thei bee eased in suche sorte, that when thei bee awakened of their slepe, thei remaine without wearinesse, and maie retourne to their labour as muche more, and so thei doe al waies, when thei have neede of it: for with that slepe thei doe receive their strengthe, and bee muche the lustier."

The potato makes its appearance in print in 1597. John Gerard reports in his *Herball,* "I have received rootes hereof from Virginia, otherwise called Norembega, which growe and prosper in my garden as in their own native countrie." He was so proud of his potato that in the portrait introducing his *Herball,* he is pictured holding in his hand, a flowering branch of this plant (illus. 4).

Carolus Clusius, the Flemish botanist who introduced the potato into Germany and France, pictures both

Cocoa.



Sir Hans Sloan, *A voyage to the Islands of Madera, Barbados, Nieves, S. Christophers and Jamaica,* 1707.

the sweet and true potato in his *Rariorum plantarum historia* published in 1601 (illus. 5). Botanists agree that both the true potato *(Solanum tuberosum)* and sweet potato *(Ipomoea batatas)* are natives of South America and had been widely cultivated before the discovery of America. In fact, the sweet potato was one of the prizes Christopher Columbus offered Queen Isabella. Clusius' labeling of the potato in the lower right hand illustration, as *Papas peruanorum,* points up its new world origins.

Cocoa, our chocolate *(Theobroma cacao),* appears in 1707 in Sir Hans Sloan's *A Voyage to the Islands of Madera, Barbados, Nieves, S. Christophers and Jamaica.* (See illus. 6.)

Of cocoa Sloan says, "It grows in the Bay of Campeche, where the nuts pass for money . . . the Indians of this country pay the King their Tribute in Cacao. In certain Provinces which are call'd Guatimala and Soconusco, there is growing a great store of Cacao, which is a Berry like unto an Almond. It is the best Merchandise that is in all the Indies. The Indians make a Drink of it, and in like Manner Meat to eat. . . To make Drink the Indians dry them on an earthen tile, grind them with Stones to Powder, and mix it with Water and Pepper, which makes a Dish fitter for Swine than Men: it was a Year before I could drink of it, for which the Indians would laugh at me: it does not inebriate: and is in greatest Esteem among the Indians."

The reports included food for the soul as well. Mark Catesby was an Englishman who, supported by patrons like Sir Hans Sloan and Peter Collinson, collected and drew the flora and fauna of the Carolinas, Florida and Bermuda between 1722 and 1726. In illustration 7, the gentian which Catesby labeled *Gentiana Virginiana* (now called *Genti-*

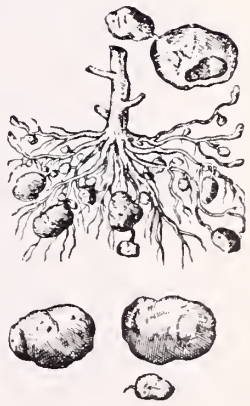
continued

Sweet Potato.



Carolus Clusius, *Rariorum plantarum historia,* 1601.

Potato.





The Natural History of Carolina, Florida, and the Bahama Islands., 1754, Mark Catesby. Gentian.

ana catesbi) is pictured with the American gallinule. Catesby found that to produce separate plates for flora and fauna was so expensive, that he combined them picturing plants with the birds or animals he had observed in their habitat. To further cut costs, he learned to do his own engraving.

Catesby says in the preface to *The Natural history of Carolina, Florida, and the Bahama Islands* (first edition, 1731), "As I Was not bred a Painter I hope some faults in perspective, and other niceties, may be more readily excused; for I humbly conceive plants and other things done in a flat tho exact manner, may serve the purpose of Natural History, better in some measure, than in more bold and Painter-Like way." Since Catesby's work predated that of Linnaeus, he did not emphasize the sexual parts of the flower in sufficient detail to fit comfortably into the Linnaean system. Linnaeus did, however, base 10 of his classifications on Catesby alone. From Frick and Stearn's researching of Catesby's correspondence, we learn of the difficulties he faced keeping his patrons in England supplied with specimens: he never had enough preservatives for the snakes, birds and small animals he wanted to ship to England. When he was able to ship specimens to England, "Even the wide-mouthed bottles, which carried snakes, birds or insects, did not escape thirsty sailors, who did not mind the animal contents, provided that they got the spiritous preservatives." In spite of such difficulties, Catesby managed to produce two stunning volumes. The gentian we have chosen to illustrate did not shake the botanical world; Catesby's technique of illustration, however, did have great influence on Audubon and delights us.

So we can see, decades elapsed at one time between a plant's introduction and its appearance in print, woodcut or engraving. Its economic or aesthetic impact has spanned centuries. Although the "hot news" took a long time to reach the world, plants like corn, tobacco and potatoes have never stopped making news. That these "firsts" are still available to us is a tribute both to the authors of these books and to the succession of owners who have cared for them over the centuries.

●

Since PHS cannot provide, in its library, the controlled temperatures, humidity, and security necessary to preserve these very old books, they are housed, by cooperative agreement, in the American Philosophical Society. Arrangements can be made through the PHS library for members wishing to see these or other rare books in the PHS collection.

How To Prune Your Evergreens

by Edwin F. Steffek
Author of *The Pruning Manual*

Edwin F. Steffek is the former editor of *Horticulture Magazine.*

Even rather well informed gardeners sometimes hesitate before pruning evergreens, fearing that they are different. Yet pruning evergreens is not too unlike pruning deciduous trees and shrubs.

Although the work can be done at other times, the best time to do any major cutting of evergreens, and needle-leaved evergreens in particular, is just before new growth starts or is still in its early stages. At that time new adventitious or emergency buds have the best opportunity to develop, and lead shoots are less likely to remain empty stubs. This is particularly true of trees like pines, spruces, firs and others with "whorl-type" growth.

On the other hand, you can take greater liberties with arbor-vitae, hemlocks, retinosporas, yews, junipers and others like them. We might make them exceptions by cutting them later so they do not have time to "feather-out" fully and, thus, retain their newly-cut, more formal appearance longer. In extreme cases we can even cut them just before growth ceases for the year to retain completely the formal look. Hedges, too, fall into this category. They may need to be cut more than once during the year and be given a late trimming to keep them tidy.

At this point I want to digress for a moment. Even good gardeners sometimes confuse shearing and pruning, but they are not at all alike. Shearing means to give the plants an all over cut, as is done with a hedge. Large, scissor-like shears or electric ones are used and everything that sticks out beyond a predetermined perimeter is cut off. Pruning, on the other hand, involves individual judgment and selection in the case of each and every stem cut. Thus, while arbor-vitae, hemlocks and their ilk are frequently sheared, the pines and plants similar to them are rarely so handled. Low, spreading junipers and yews when grown in a natural fashion are usually pruned instead of sheared, because judicious cutting is needed to retain the desired forms.

We are usually admonished to remove no more than the annual growth at any one cutting. With the hemlock, arbor-vitae group, in particular, this is pure bunk. I have successfully reduced some that were reaching up toward second story windows to half their height and less. In such a case, you first cut the specimen back to the desired height. Then you make certain a lead or terminal shoot exists, tying a new one into the upright position (illus. 1), if necessary, and finally restoring the natural or desired shape to the trimmed plant by a combination of pruning and shearing.

As indicated above, all evergreens producing their branches in whorls or circles around the stem must be treated differently (e.g., pines, spruces and firs). With few exceptions, the central or lead shoot should be guarded jealously and, if lost through accident or insect attack, it must be replaced. Otherwise, the tree is likely to become misshapen with several shoots competing for the lead position. Therefore, if a stub still exists, the most vigorous shoot in the top whorl should be tied to it in an upright position for a few years. When it is

continued





Illustration 1

Above, new leader tied up. Below, removing lateral leader for thickening.

Evergreens continued

firmly established in its new position, remove the old stub.

If, however, the terminal shoot is completely missing, what then? In such a case, lash a stake firmly to the trunk so that it protrudes above the topmost whorl and provides a support upon which to fasten the new lead shoot.

Although a terminal or lead shoot must always be present to provide for the trunk's growth, such evergreens may also be pruned, but confine the pruning to the side branches. In fact, where the growth is too sparse, it may readily be thickened up by removing the lead shoots on all the lateral branches. The forward growth is thus restricted and the energy thrown into the lesser or whorl growth making the plant bushier. This cutting may be done at any time but the earlier the better and, best of all, it is done by removing the central bud of each cluster with the fingers before it starts growth.

The broadleaved evergreens are, again, handled differently. At one extreme are the hollies, which can stand almost any amount of cutting and still retain the ability to throw out adventitious buds and new growth. Boxwoods, too, lend themselves to severe shearing, when necessary.

Rhododendrons, mountain laurel and pieris, on the other hand, must be treated gingerly. They, too, tend to produce their growth in few-branched whorls, frequently one set per year like the pines. If you want to thicken the plants, the new growth can be removed but, preferably, only back a maximum of three annual whorls. Beyond that the danger of the plant's losing its power to produce new buds with resultant bare stems and stubs is too great. Such cutting, of course, is best done after flowering and at all times seed heads should be removed as soon after formation as possible to channel all the plant's energy into new growth and flower buds instead of seeds.

If the growth becomes so long and leggy that the plants are unsightly, there is only one recourse. Cut the plants to within a few inches of the ground. You can do this in installments, cutting one or more of the oldest canes each year over a period of several years or, better, all at once. If you do it all at once, you will have vigorous, shapely, new plants in about three years.

●





Illustration 2

Above, sheared. To the right, pruned.

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Orchid Hobbyists will enjoy the meetings of the Southeastern Pennsylvania Orchid Society held the second Wednesday of each month at 8:00 p.m. in Clothier Hall in the Bryn Mawr Hospital Nurses' Home. Beginners and advanced orchidists will find the programs interesting and informative. For information call MI 2-0878.

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Jean Byrne, Editor



Ginkgo biloba.
See story on page 22.



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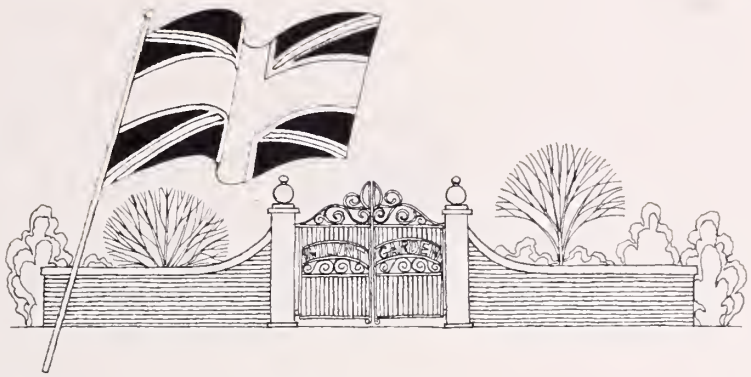
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Photo by Edmund B. Gilchrist, Jr.

Back Cover: See story on page 12.
Photo courtesy Winterthur Gardens



Should We Follow the British Lead?

Gardeners visiting England and Scotland can't miss the British National Trusts. These are a uniquely popular system of formerly private gardens of considerable size.

It is not commonly known here that the great majority of that system's visitors are the English themselves. The size, diversity and beauty of the gardens and the great variety of plants, are becoming familiar to the average British citizen, who pays to preserve their excellence.

The motive for building this system is preservation. High costs and taxes have created insurmountable problems for the garden owners. To solve these, the gardens are donated to the Trusts and the occupants or previous owners retain limited, yet acceptable, rights of various kinds. Placing these institutions under one general management has worked wonders, and what was once viewed as a calamity has turned out to be of great international benefit. The smoothness with which these gardens were commercialized is the product of hard work and good organization behind the scenes.

We ask whether this need be the only such system. Far more American gardens could be opened to the public and far more Americans would undoubtedly visit them than now stop at the few well-known tourist attractions. True, the owners don't face the British level of "death duties." Yet under the right controls, many would be glad to have the public enjoy what they have produced and to have funds to enlarge, improve and maintain the gardens.

An American system with several estates close to each city is not inconceivable. And there already exists a purely American business style which can be applied—the franchise chain. We envision, for the future, a catalog of Holiday Gardens, or Garden Hiltons, covering every state and Canada. The catalog would tell us the location, size, specialties, fees, hours, best seasons, parking, and facilities and coincidental shops. Where can we find the talent to promote this scheme?

J. Franklin Styer

J. Franklin Styer, a member of the Pennsylvania Horticultural Society's Council, is also a Fellow of the Royal Horticultural Society.

guest editorial



Lenchen Kisch at The Greenhouse, a combination restaurant-greenhouse.

photos by Edmund B. Gilchrist, Jr.



Button fern *(Pellea rotundifolia)*

The GREENHOUSE

A Tradition Since 1975

As the General made his way across the river and over the rolling hills lush with vegetation, he sensed his horse weakening, much as he knew he himself was in need of food and rest. Passing a lone boy along the roadside, he stopped and asked if there were an inn nearby, and a stable.

"A stable there is, sir, just off the main road. But a tavern where ye can find food and drink, nay there is none."

Probable Scenario
L. Lamstein

If George Washington visited the Main Line now, he would have no trouble finding an excellent meal served in an indoor garden of tropical greenery. The Greenhouse, serving fine continental food with casual elegance, is situated in a converted 18th century stable. Its several additions include a modern greenhouse that is both a dining area and a place to buy unusual plants.

When Mary Bentley and Mary Martin decided to open a new restaurant a year and a half ago, they hadn't expected to call upon Mary Martin's horticultural experience for the venture. Martin had been trained as a horticulturist and had served as chief propagator at the Morris Arboretum, long before becoming a restaurateur. Although she had not intended to combine plants and dining, the available greenhouse opened new possibilities for use of the Radnor landmark.

New possibilities—and a few prob-

continued



Mary Martin, one of the owners of The Greenhouse, prunes a plant before the dinner hour.

by Lynne Lamstein

Lynne Lamstein managed The Greenhouse plant store from its inception until last spring when she began a short stint with the National Park Service. At present, she is completing a degree in horticulture at Temple University.

GREENHOUSE continued

lems for me as manager of the horticulture operation. Fortunately, the environment of the Greenhouse is conducive to the healthy growth of tropical foliage plants. We have, in addition to the greenhouse, wide expanses of windows with different exposures, so we have excellent light. For the more dimly lit Back Stable Room, we selected plants that thrive in low light such as sansevierias, some philodendrons, and a few fern varieties *(Nephrolepis exaltata* 'Bostoniensis,' *Davallia* spp., *Asplenium nidus,* and others), and these are rotated to better lit areas. I attempted to find *Aspidistra elatior* for the darker spots, but was unable to locate satisfactory specimens of the once popular cast-iron plant. To accommodate our popular collection of gesneriads, I installed fluorescent lighting in an existing set of shelves.

We had to experiment to arrive at a temperature range comfortable for the diners and the plants, but once it was established we had few problems. Spiritless drooping leaves on the *Schefflera actinophylla* quickly let me know the greenhouse was too cold for them at night, so I moved them to the more consistent warmth of the inner rooms. I was heartened to see how readily the plants and the patrons made themselves comfortable and companionable in all rooms of The Greenhouse.

I found it necessary to concern myself with the forms of the plants. Throughout the restaurant there is little room for broadspreading plants. I quickly learned that while it is pleasing to be surrounded by an abundance of lush greenery and to share a table with a discreet container of delicate ferns, it is annoying to have a broad leaf extending over a shoulder as if to read the menu or an arching frond placed where an apology is required to pass by it. With this in mind, I often sought narrow cane plants such as *Yucca elephantipes* and *Dracaena massangeana.* Similarly, for tight spots I chose plants like the supple *Ficus benjamina* over its stiffer relative *F. elastica* 'Decora' because the former is less likely than the rubber plant to suffer when brushed against.

The plants not only made the room more attractive, they function in other ways. For example, they provide graceful screens and barriers to other parts of the room. Pots of grape ivy *(Cissus rhombifolia),* set in a rectangular wicker basket and encouraged to climb on nylon string, block an unwanted passageway. In the greenhouse, where headlights from the parking lot would be disturbing, espaliered *Ficus benjamina* help deflect the glare. With a careful eye on the changing needs of the dining rooms, co-owner Mary Bentley often suggests a setting of plants to enclose or decorate an area reserved for a private party.

It is annoying to have a broad leaf extending over a shoulder as if to read the menu or arching frond placed where an apology is required to pass by it.

Since The Greenhouse plant store does not aim to supply all the needs of the houseplant enthusiast, we have been able to forsake selling "starter" pots of the most common plants in favor of carrying more unusual varieties. Thus, we have sold the splendidly pink-panicled *Medinilla magnifica,* available locally a decade ago but uncommon now. Our collection of ferns tends to include such difficult to find species as *Pityrogramma calomelanos,* the aptly named goldback fern, and *Polypodium polycarpon* 'Grandiceps,' the climbing bird's nest fern. Members of the maranta family, the ctenanthes, have graced modestly lit areas. A little hunting turned up *Ctenanthe lubbersiana, C. oppenheimiana,* and the glowingly colorful *C. oppenheimiana tricolor.*

Another critical consideration influenced the choice of plants for The Greenhouse. As a restaurant we are prohibited from using chemical pesticides, so control has to be protection through cultural techniques and manipulation of the environment, and through exclusion by selecting from disease free sources and removal of infected plants. With these restrictions in mind, susceptibility to pests and diseases became important when buying plants.

I avoided plants that I had found to be highly vulnerable to spider mites. These included varieties of *Gardenia jasminoides,* crotons (*Codiaeum* spp.), most palms, *Fatsia japonica,* false aralia *(Dizygotheca elegantissima)* and varieties of English ivy *(Hedera helix).* Because of their singular lushness I risked introducing scheffleras into the restaurant, but only after careful and frequent inspections for mites. We have been able to prevent problems with the scheffleras by avoiding dry locations and washing leaves with a mild solution of soap and water.

White fly caused concern as spring approached and fuchsia, lantana and potted herbs appeared on the market. Our herb supplier suggested spraying twice daily with a weak solution of dish washing detergent, a practice which proved effective but very time-consuming. I kept our stock of flowering baskets minimal, except at holidays, until it was warm enough to rotate them outside where white flies posed less of a threat. We have had no problems with aphids even though I courted danger with an occasional Balfour aralia *(Polyscias balfouriana),* a shrubby native of New Caledonia that I find irresistible. We did lose one palm to scale, but have not had battles with mealy bugs.

In The Greenhouse, where pesticides are taboo, the careful selection of pest-resistant plants is followed by constant watchful care, which is critical. I questioned growers about their spray programs and avoided those who could not be depended on to provide clean plants. Plant maintenance at The Greenhouse

continued



The Greenhouse has many different exposures.



The Greenhouse in Radnor



Cyclamen and
Ficus benjamina

has always been handled skillfully and sensitively by Lenchen Kisch, who came to work soon after her arrival from Rumania. I speak no German and she spoke little English, so our initial communication was largely limited to discussions of specific plants, the language appearing to be universal. I soon understood when she told me she loves all living things. It is clear that the plants thrive under her devoted care.

In spring the realm of plants extended beyond the greenhouse and the barn red siding. Knowing that "Who loves a garden loves a greenhouse too," we assumed the converse and created a dining patio. The hedges of *Abelia grandiflora,* the azaleas, and the perennials provide an interesting complement and contrast to the tropical plants inside. Although troubled with problems of heat and glare from the sun, the dining garden does provide a pleasant interlude on mild days.

The plants are lush and refreshing. Soft sounds fill the air. And the aroma of delicious food pervades. The Greenhouse is no ordinary restaurant; it appeals to all the senses.

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The Greenhouse is located at 333 Belrose Lane, Radnor. (Tel. 687-2801)

UP ON THE FARM



photo by Edmund B. Gilchrist, Jr

Year One

by Roland C. Davies

Roland Davies is an architect who has lived and practiced in the Society Hill and Old City area of Philadelphia for 15 years. His wife Peggy and three sons are amateur but avid naturalists and ecologists.

The First Year

Early in the spring of 1975, a series of events prompted me to pursue an idea I had had for years. As an architect, I had been intrigued with the concept of sod roofs, or building a structure into a hill and covering the roof with earth, or berming the soil up around the walls. So when our neighborhood garden plot developed well beyond the original concept of a "4H" type project for the kids, with only the parents now participating, and when we were told the lot would be covered with a new building the following year, I finally decided to use the roof of my office for a garden. I had roughly 24 sq. ft. of usable space on my building, a five-story warehouse converted to offices, located on Strawberry Street (near 3rd & Chestnut) in Old Philadelphia.

After pricing topsoil and calculating the load it would place on the rafters, I realized that there had to be another way. In the Ortho garden manual, *All About Vegetables,* I came upon a method of using "non soil" for planters. Recommended for a cubic yard of "soil" were two bales of peat moss, three bags of vermiculite, thoroughly mixed with six pounds of 5-10-10 fertilizer, two pounds of superphosphate, and five pounds of lime.

continued



photo by Deborah Zubow Prindle

Year Two

I had on hand some floor joists that had been removed from the building when I remodeled it. They were full 2 x 12s, about 12 ft. long and were stored in my basement shop. I lugged them up to the first floor from the basement. From there I was able to balance them on top of the elevator cab and very slowly take the elevator to the 4th floor, through the elevator door and then haul them up the stairs to the 5th floor. Next each 2 x 12 was threaded through a 2 ft. by 3 ft. trap door to the roof, with me balanced on an old 8 ft. step ladder below. After several such trips, I began to realize that shopping at the Italian Market made a lot more sense. Somehow I managed to get eight 2 x 12s to the roof. Realizing that a 12 ft. x 12 ft. planter would be hard to manage, I cut some of the timbers in half, forming two planters 12 ft. by 6 ft. and one planter 6 ft. by 6 ft. I felt that was just the right amount of garden to experiment with that first year. The 2 x 12s were placed on edge with reinforcing sheet metal straps nailed to the outside of the corners (illus. 1).

Getting the "non soil" up to the roof was another problem. The bales of peat and the bags of vermiculite wouldn't fit through my trap door, so I had to divide them up into plastic trash bags — again balancing on the ladder.

the fun begins

The roof has a slight slope, so for drainage I placed a layer of pea gravel along the lower inside edge of the planters (illus. 2), which were centered on the roof, positioned with the short dimension parallel to the pitch of the roof; I put a 30-in. walkway between. I lined the planters with heavy polyethylene (sheet plastic) because I wasn't sure what would happen if the roots came in contact with the asphalt roof coating.

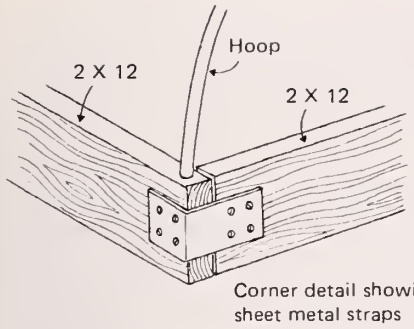
During the summer months, the night hawks . . . screech overhead with their erratic flight, diving suddenly at a streetlight for a tasty moth.

Mixing the ingredients in the planters was the easiest of all the tasks and soon I had around 10 in. of fluffed "non soil," which to my horror fluffed away in the fresh breeze now whipping across the rooftops. Polyethylene came to the rescue again, and I covered all the planters with plastic, stapling the edges securely to the planter boxes. Since the Ortho book urged using plastic as a "mulch," I felt I couldn't go wrong.

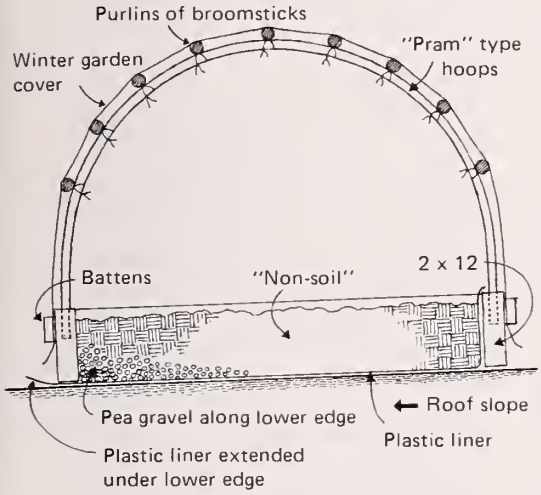
I sowed the seed through carefully cut slits in the plastic. I planted lettuce, carrot, cucumber and bush bean seeds along with sets of tomato (regular and cherry), eggplant, broccoli, cabbage, pepper, cantaloupe and watermelon.

As the plants began to mature, the problem of staking became apparent. I remembered some treasures I had picked out of a neighbor's trash several years before, namely vinyl covered pipe hoops — the kind used for convertible tops on small power boats. To my pleasure, the bottom dimension of the pipes matched the short dimension of the planters. After simply drilling holes along the sides of the planters, I inserted the pipes creating a framework for tying up plants, holding sun screens, and eventually, if I ever get around to it, a greenhouse.

As the growing season progressed, the sun got hotter and the temperature under the plastic sheeting rose to the point where it actually emitted steam on crisp mornings. I had to cut additional slits and water a great deal in



Corner detail showing sheet metal straps



the early mornings. One good thing about the "non soil," the water saturated to a point, then ran out the bottom of the planter, protecting the plants from drowning and the roots from rotting.

The growing conditions must have been ideal because the plants thrived; however, not being too scientific about some things, I did have problems. The lettuce didn't break any records, maybe the "soil" was too hot; the carrots didn't mature to a decent size, maybe there wasn't enough depth. I planted the cantaloupe plants too close together, and they spread and intertwined, forming a dense mat, stunting growth somewhat; and a weekend heatwave burned up the watermelons while we were at the shore. Every few weeks, or after an unusually hard rain, I supplemented the non-soil mix with a mixture of liquefied seaweed and water. This type of fertilizer, called Maxicrop, is an organic garden fertilizer and soil conditioner, which was given to me by a friend from Maine.

My successes made up for the failures: I got tomatoes and lots of them, eggplant by the dozens, cucumbers, cabbage later, small but delicious cantaloupe and many banana peppers.

All in all, the first year was a delight. I didn't keep an accurate record of my harvest. If I had, and done some arithmetic comparing the cost of the basic materials with my harvest, I would have been discouraged.

The Second Year

Business kept me occupied in the spring of 1976, so I didn't get to my garden until late June. I put in lettuce, swiss chard, bush bean and lima bean seeds with tomato, eggplant, broccoli and pepper sets in the two big planters only. This season the "soil" was of a different consistency, not as light and loose. I had added another bale of peat moss and the fertilizers before planting, so I decided to try it without the plastic cover. It worked even with some severe wind storms over the summer.

Weeks later, I noticed small, random patches of green appearing, which I recognized as tomato plants. They turned out to be cherry tomatoes that had dropped to the soil and been buried last year. I was able to break the mass of seedlings apart and plant the hardiest in the small planter that soon became full of plants. The small planter somehow has become the problem child. It has a different type of vermiculite and therefore a different "soil" consistency, which doesn't hold water as well. So when the orphans were planted, they were also somewhat neglected. They were never staked or pruned and soon became such a mass of intertwined branches that it was difficult to find the cherry tomatoes until they were bright red. On November 12th, I decided to take all the tomatoes in before a reported freeze. I picked 20 dozen half ripe cherry tomatoes. They have all ripened since then using the "brown bag" method. We ate the last two dozen this past Thanksgiving, along with fresh swiss chard, which is still growing under small plastic bags that I put over them before a freeze. The broccoli is still putting out buds which, along with the tomatoes and chard, have been cooked in a wok as sukiyaki at least once a week, a treat relished by all.

In the winter of '76-77, I covered the planters and attempted another growing season. There seemed to be enough heat build-up during the day to make the plants withstand even severe cold during the night. (This morning, Nov. 30, 1976, I picked enough broccoli for two meals and it was 17° out. That was before I covered the hoops with plastic.)

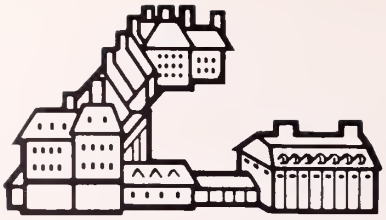
Pests

An interesting note about "non soil" gardening and my rooftop "farm" is that there are no weeds except for an occasional ailanthus tree, which grows from wind-borne seeds. This past summer and last, I was plagued with a few bugs and problems. The cabbage last year had worms which I was able to control reasonably well just by picking them off. In the second year the broccoli was hit with aphids; I was able to control them somewhat with ladybird beetles caught in our backyard and transplanted to the roof. The beetles multiplied with amazing results, but seemed to be reduced in numbers after each good wind. My tomatoes developed some blossom-end rot early in the season, but it seemed to lessen later on. I must devise a more effective sun screen to keep the "soil" from getting too hot for those vegetables that require cooler temperatures.

There have been many additional bonuses from my rooftop world. We have had beautiful ringside seats to several fireworks displays this past spring and summer. I get a kick out of going up to the roof almost daily and picking the makings of a salad or a sandwich for lunch. During the summer months the night hawks ("bull bats" as I have called them since I was a boy) screech overhead with their erratic flight, diving suddenly at a streetlight for a tasty moth. Last month around dusk, I startled a sparrow hawk with its half-eaten kill, sitting next to one of the planters. It took off, circled and then landed on a windowsill of the Customs House where it finished its meal. Also I was able to get glimpses of the tall ships on the Delaware River this summer.

The therapeutic effect of being on the roof and working the garden is perhaps the greatest reward. When I look out over the acres of rooftops—all unused and empty—it makes me wonder why a great resource isn't being taken advantage of in these times of concern.

●



Rare Plants at

by Hal Bruce

Hal Bruce teaches a course on horticultural and botanical writing among his roster of English classes at the University of Delaware. For five years, Bruce was taxonomist at Winterthur in Delaware and is taxonomical consultant there at the present time. In 1968 Viking published his book, *Winterthur in Bloom*.

Most of us know Winterthur, the estate of the late Henry Francis duPont near Wilmington, Delaware, as a museum of American period furniture surrounded by acres of beautifully landscaped gardens. Fewer of us, perhaps, realize that those acres of gardens contain a wealth of rare and unusual plants. One of the greatest charms of Winterthur lies in the fact that the visitor is constantly coming across some rarity that up until now s/he has only read about, or seen as a herbarium specimen, or possibly seen growing in a botanical collection. Yet here it is, growing not as a single specimen, perhaps, but in a drift of several, possibly surrounded by more common neighbors, which harmonize or contrast with it and invariably enhance its beauty.

Winterthur is full of rare plants that seem buried in the landscape but really are not. Take for example the heather bed, which runs in a wide belt across the lower, south-facing slope of Oak Hill. Its predominant plants are heaths, which range from the ordinary to the very rare—cultivars of Scotch heather and spring heath, dwarf vaccinium, Cornish and cross-leaved heath, and the seldom seen spike-heath *(Bruckenthalia spiculifolia)*. Mauve colchicum blooms among these at the east end in autumn, and seems to spill out and down the hillside in huge drifts. A rare squill, *Scilla chinensis,* with spikes of pink flowers, blooms in feathery tufts among the heaths in summer. At the west end other shrubs intermixed with the heaths effect a transition between the low heath and the taller lilac, dogwood, and deutzia of Oak Hill. Here there are drifts of two species of indigofera, of butterflyweed, of four hybrid cultivars of summer-blooming spiraea, of *Diervilla* x *splendens,* and of *Leptodermis oblonga,* a rare shrub of the coffee family with the habit of a spiraea and the flowers of a lilac, blooming all summer long.

The dominant motif of all these plants is that produced by the heaths: clusters of small, dusky rose-pink, occassionally white, flowers on low plants with bronzy or gray-green foliage. This motif is echoed in the spiraea, and interestingly varied: *S.* x *lemoinei alpestris,* low, mat-forming, almost heather-like, with dusky rose flowers in flat corymbs; *S.* x *margaritae,* exactly like the preceding but growing to a height of about 4 ft; *S.* x *billiardi,* a "steeplebush" in rose pink, an upright, suckering shrub that forms a dense stand of nearly unbranched stems, each terminated by a spire of blossoms; *S.* x *sanssouciana,* a hybrid of the flat-clustered *S. japonica* (which is the parent also of x *lemoinei* and x *margaritae*) and the panicled or steeple-clustered *douglasi* (one parent also of x *billiardi*) with pink flowers in fat, conical, extremely showy heads. I have emphasized the parentage of these plants to show their complicated interrelationships and to stress the family likeness inherent even in the extremes among them—the low, horizontal *lemoinei* and the tall, vertical *billiardi.*

The indigos—pink *Indigofera kirilowi* and white *I. incarnata alba*—are complementary in color and height, being low, stoloniferous, clumping plants, but quite contrasting in texture, with their compound leaves and large, locust-like blossoms. A still stronger contrast in texture occurs in a stand of *Lycoris squamigera* whose pink lily-like flowers rise above the indigos and dwarf spiraeas in August.

Finally, a drift of yellow to orange butterflyweed, *Asclepias tuberosa,* is a strident contrast in color (though its low habit and rounded clusters of small flowers help to harmonize it with its neighbors) with the yellow, tubular blossoms of the diervilla further along the path. The lavendar-mauve leptodermis flowers produce several effects. They balance the similarly colored colchicum at the opposite end of the bed when the latter are in bloom, they contrast beautifully with the color of the neighboring diervilla's flowers, and they also, since they are similar in size, shape and disposition, complement the flowers of the diervilla.

Having written that, I see that I am praising the plantings of Winterthur, rather than the plants, and though that is not the point of this article, it is hard to avoid. Perhaps skill in landscaping and the use of such choice plants as *Scilla chinensis,* leptodermis, and bruckenthalia are really not separable after all; for if Winterthur's landscape enhances the beauty of these plants, and if as part of the inherent composition of the garden they take on interest and grace far surpassing that in the gardens of collectors, then conversely they enhance greatly the beauty of the landscape. There always seems something a bit too arch about collectors' gardens (I say this without malice, since I suffer myself from collectomania). All too often plants in such gardens seem to advertise their owner's discrimination and good taste rather than their own merits. The rare plants at Winterthur, in contrast, compete so lustily with their commoner neighbors that their status as curiosities is apparent only to those who are looking for it. For me this adds an exciting new dimension to the landscape.

There are far too many examples like the heather bed at Winterthur to describe fully in an article. I will mention only some of the outstanding plants in key areas, starting with those that the visitor first sees on arrival at the Pavilion. The accompanying map may help the reader in determining locations in the garden.

The summer shrub planting near the Pavilion consists of a group of showy hydrangea, hibiscus, vitex, and albizzia, which show color in summer. Planted with them is a handsome *Stewartia koreana,* a paperbark maple *(Acer griseum),* and an *Ehretia thyrsiflora,* an interesting arborescent borage that looks rather like a small black gum in stature and bears panicles of tiny white flowers in early summer. Several large specimens of the hybrid viburnum 'Willow-wood' flower for much of the

Winterthur

summer. There are also cultivars of *Buddleia davidi,* and a most interesting hybrid butterfly-bush, *Buddleia* x *pikei* 'Hever' *(alternifolia* x *caryopteridifolia),* a broad, twiggy shrub with small grayish leaves and large compound clusters of deep lavender flowers produced from late spring throughout the summer.

Near the Pagoda or Mushroom Seat is a fern garden, whose most arresting inhabitant is an evergreen species from Japan, *Dryopteris erythrosora.* Its glossy green fronds are a brilliant crimson when young, and the fruit dots on mature foliage are red also, hence its alternate common name, red-fruited woodfern. Nearby two huge specimens of epaulette tree, *Pterostyrax hispidus,* shade a drift of the pink and white late-blooming Azalea Magnifica, showing their extraordinarily shaped clusters of whitish flowers in late spring. Beyond this planting is the Peony Garden, which contains many rare and lovely species and hybrids, including the robust yellow tree peony, *Paeonia lutea ludlowi.*

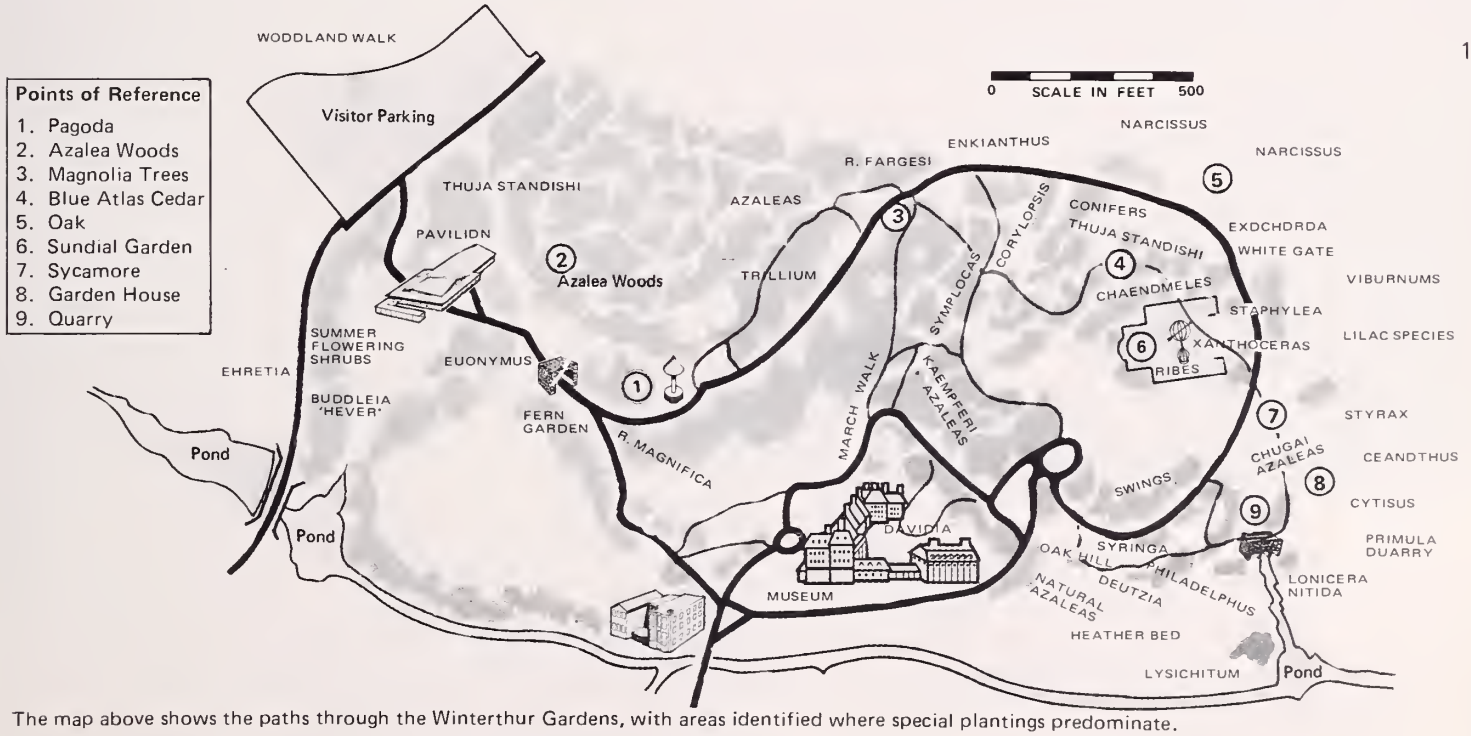
Atop the hill in the Azalea Woods (area 2 on the map) are masses of rhododendron and azalea. Here we find in early May the peach-pink *Rhododendron vernicosum,* Rock 18139, and the fragrant blush-pink *R. fortunei,* the species that is supposedly the ancestor of the Dexter hybrids but which is itself rare in gardens. The ground is carpeted with woodland plants such as cowslips, phloxes, trilliums of several species. A drift of *Anemone appenina* with flowers like pale blue daisies blooms beneath pink torch azaleas *(R. kaempferi).* At the eastern edge of the Azalea Woods two large-leaved species rhododendrons bloom with large, dark-blotched pink flowers in early April, the rather compact *R. fargesi* and the tree-like *R. sutchuenense.*

Beyond the Azalea Woods we encounter a planting dominated by enormous trees of *Magnolia* x *soulangiana* nearly 100 years old (area 3 on the map). A roadside bank in the middle of May is bright with pink and white Azalea Magnifica, white *Spiraea cantoniensis* cv. Lanceata, and the blue of camassias and irises. Here also is the beautiful little *Scilla amethystina,* with large, pyramidal spikes of starry lavender flowers. On the edge of the old golf course stands a single specimen of *Enkianthus perulatus,* with the broad, twiggy habit of a Kurume azalea, pretty pendant white flowers in early spring, and brilliant red autumn foliage.

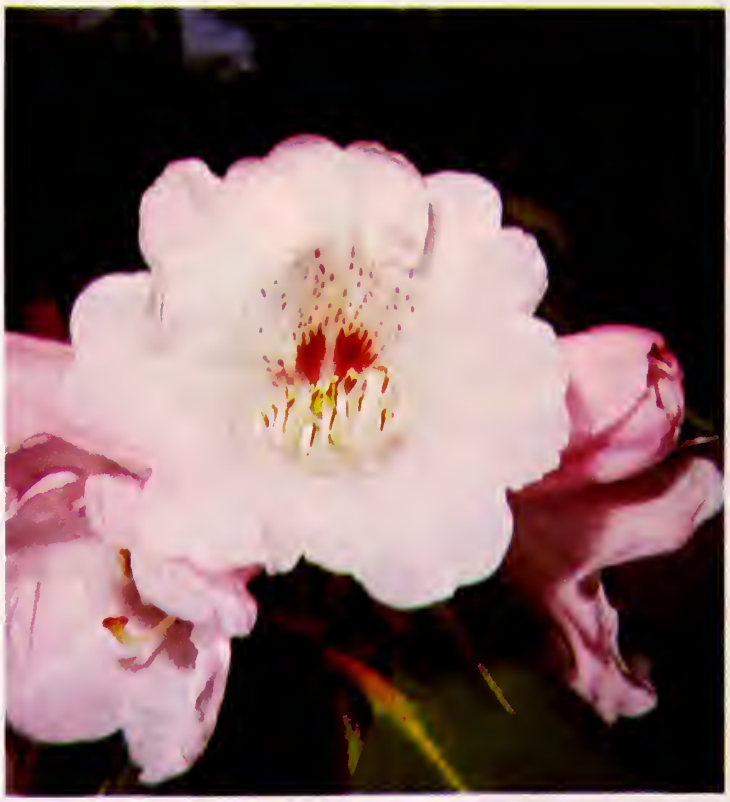
Across the road, near the magnolias, cutleaf lilac *(Syringa laciniata),* a delicate species with divided leaves and mauve flowers is interestingly combined with Kurume azaleas of the same color. Near them are a large cutleaf Japanese maple, a double-flowered dogwood, *Cornus florida* 'Pluribracteata,' and a rather tender evergreen viburnum, *V. henryi,* with most unviburnum-like foliage. On the opposite side of the magnolias is a specimen of the very rare five-leaf azalea, *R. pentaphyllum* from Japan, which bears showy, deep pink flowers before its leaves appear. Here also grows *Prinsepia sinensis,* a relative of cherries with gray, thorny branches, early yellow flowers, and edible red fruits. Its most distinguishing characteristic is that it is the first of all deciduous shrubs to leaf out in spring, its pale gold-green new leaves as showy as flowers in the cold air of March and April.

On the edge of the Pinetum is a collection of deciduous shrubs that makes a spectacular show in early spring. The chief plants here are the Korean rhododendron, *R. mucronulatum,* with large blossoms of mauve or lavender, and three species of winter-hazel: *Corylopsis pauciflora, C. platypetala,* and *C. spicata,* all with pale yellow flowers. Occasional specimens of prinsepia punctuate the planting, and the ground beneath the shrubs is carpeted with

continued



The map above shows the paths through the Winterthur Gardens, with areas identified where special plantings predominate.



1



2



3

Rare Plants continued

bergenias, Christmas-roses, lenten-roses in white, lavender, and magenta, and the rare *Primula abschasica,* whose strident magenta blossoms appear so early in the year that their color is welcome. A tiny bulb-flower, *Corydalis bulbosa,* which looks like a Dutchman's breeches in lavender, carpets large areas also.

The Pinetum (4 on the map) is a collection of conifers, many quite unusual, which was planted about the time of the First World War. There are huge, handsome specimens of tigertail spruce, Nikko fir, incense-cedar, Japanese white pine, umbrella-pine, western arborvitae, and false-cypress, including the blue-leaved retinospora forms of the last. Japanese arborvitae, *Thuja standishi,* is most attractive with its

continued

1. The *Rhododendron fargesi* blooms in early April in the Azalea Woods.
2. *Enkianthus perulatus* blazes in the fall. In the spring it bears pretty white pendant flowers.
3. The rare yellowhorn *(Xanthoceras sorbifolium)* blooms in late spring in the Sundial Garden.



4



5



6

4. The beautiful little *Scilla amethystina* with large, pryamidal spikes of starry lavender flowers.

5. The *Prinsepia sinensis,* a relative of the cherry has gray, thorny branches, early yellow flowers and edible red fruits.

6. *Galanthus elwesi,* the handsomest of the snowdrops.

photos supplied by the Henry Francis du Pont Winterthur Gardens

drooping, dark green leaves.

The White Gate, at the eastern end of the Pinetum, features huge specimens of pearl-bush, *Exochorda racemosa* and *E. giraldi,* a tall dawn-redwood; the single form of *Kerria japonica;* and an unusual bladdernut, *Staphylea colchica,* a robust shrub with elder-like leaves and drooping panicles of fragrant creamy flowers in spring.

In the Sundial Garden (6) the rare yellowhorn *(Xanthoceras sorbifolium)* rubs shoulders with spiraeas, flowering cherries and flowering quinces. It is a small tree with rugged bark and branches, and compound leaves reminiscent of its close relative, koelreuteria. Its attractive five-petaled flowers, white with yellow centers, are borne in long racemes in late spring. Also here are beds of the evergreen privet honeysuckle, *Lonicera pileata,* around the sundial, and a planting of mauve early-flowering hybrid rhododendron with *Ribes aureum,* a current with pretty pale yellow flowers in April.

Beyond the giant sycamore to the east of the Sundial Garden is an enormous plantation of shrubs, most of which bloom in late spring and early summer. There are numerous viburnums, including the yellow fruited *V. dilatatum* cv. Xanthocarpum; lilacs, including the rare *Syringa pekinensis;* stewartia; mock-orange; deutzia; dogwood. The giant dogwood, *Cornus controversa,* is a vigorous tree species (to 65 ft. in its native Japan) with stout upright trunk, horizontal branches, handsome foliage, and broad cymes of white flowers like those of elder in spring, followed by blue-black fruits. *Styrax obassia* is a narrow, upright tree with exfoliating bark, large, orbicular leaves, and long racemes of flowers like white bells in late spring. Near the Bristol Summerhouse (8) are three shrubs of interest: *Magnolia sieboldi,* a shrub with pendant flowers, white, fragrant, and showing a central cone of red filaments, which renders them exceptionally beautiful; *Cytisus battandieri,* a broom with silky gray foliage and spikes of fragrant yellow flowers that remind one of a laburnum; and *Ceanothus* x *pallidus roseus,* a hybrid 'New Jersey Tea' with pale pink flowers. The last-named is representative of a large group of interesting hybrids produced in France during the early years of the nineteenth century, which have unfortunately almost died out in gardens over here.

The Primula Quarry (9) contains a wealth of rare plants: primroses of several species; *Corydalis cheilanthifolia,* a rock plant with ferny leaves and yellow flowers; *Photinia villosa,* like a thornless hawthorn with white blossoms, red fruits, and brilliant autumn foliage; *Clethra barbinervis,* a tall, elegant sweet-pepper bush from Japan; the Exbury form of the coveted *Rhododendron yakusimanum; R. makinoi,* with narrow foliage, dark green above and cinnamon beneath; Pieris 'Forest Flame,' with brilliant red young growth. Below the quarry bridge grow *Cornus officinalis,* a tree with bark like a sycamore and pale yellow flowers in earliest spring; *Coriaria japonica,* which grows like a sumac and bears axillary clusters of brilliant berries, red changing to black; the delicate and none too hardy box honeysuckle, *Lonicera nitida,* with tiny evergreen leaves; and, in a small bog near the ponds, western skunk-cabbage *(Lysichiton americanum),* which shows its bright yellow spathes in early spring.

. . . here are growing some unusual species quite unlike the ordinary run of deutzias, and some of the old French hybrids which, like so many other old-fashioned plants, are fast disappearing from gardens.

Along the walk from the Quarry to Oak Hill one encounters a planting of huge, almost treelike, specimens of plumleaf azalea, *Rhododendron prunifolium,* a rare deciduous azalea native to Georgia, which bears red flowers in July and August. On Oak Hill proper there are many other native azaleas, as well as certain rare exotic species like *R. weyrichi* and *R. amagianum,* both of which are late to flower and an unusual orange-pink in color.

Most of the plants on Oak Hill are intended for color in early June. There are species lilacs like *Syringa reflexa, emodi, wolfi, julianae,* and *meyeri.* The last is a slender-branched, very vigorous shrub with enormous compound panicles of grayish mauve blossoms in May, an excellent foil for the pure pinks and whites of the native azalea growing nearby. One seldom thinks of deutzias as rare plants, but here are growing some unusual species quite unlike the ordinary run of deutzias, and some of the old French hybrids which, like so many other old-fashioned plants, are fast disappearing from gardens. *Deutzia chuni* is a graceful shrub with arching branches and narrow, gray leaves. It flowers in June, the last of the genus to bloom. The hybrid cultivar Magicien is a tall, long-leaved plant with showy lavender flowers. *D.* x *magnifica latiflora* is a tall shrub with enormous double white blossoms, while *D.* x *wilsoni* is distinct for its large leaves and flowers and the rich cinnamon-brown color of its bark.

A woodland walk leads from Oak Hill back towards the Sundial Garden. Along it are many wildflowers and exotic woodland plants like the western *Trillium chloropetalum* and the European oxlip, *Primula elatior.* Near the swings (which are functional and often used by visitors) is a single plant of cinnamon clethra, *Clethra acuminata,* a native of our southern mountains, which is remarkable for the brilliance of its cinnamon-colored bark, the clarity of color of its bright green leaves, and the size of its white flowers.

In the shadow of the Museum itself grow a number of interesting plants, including a large davidia, various camellias and magnolias, *Hamamelis mollis,* large specimens of weeping Norway spruce, and an interesting and very rare holly, *Ilex centrochinensis,* which is a good species but looks like a hybrid between Perny and Chinese holly.

The March Walk, a path leading north from the Museum conservatory to the big magnolias, is of special interest in late winter and spring, when literally thousands of bulbs flower. Spring snowflake, *Leucojum vernum,* and the closely related snowdrops, galanthus, whiten the ground beneath the beeches and oaks as they flower. *Galanthus elwesi* is probably the handsomest of the snowdrops, but *G. byzantinus* is almost as showy and is distinct for its twisted and curled leaves. Here also there are drifts of *Adonis amurensis,* a ferny-leaved relative of anemone and ranunculus whose large golden flowers push out of the ground before the winter's snows have melted.

There are acres of species crocuses, squills, chionodoxas, winter-aconites, and a vast variety of daffodils. There are also many different species of trout lily or fawn lily: *Erythronium albidum,* with chalk-white flowers; the deep pink *E. revolutum;* pale yellow *E. citrinum;* near-lavender *E. hendersoni;* bright yellow, twin-flowered *E. grandiflorum;* and *japonicum,* with pink flowers, the largest in the genus.

The final station on our trip is in some ways the most interesting, because it is the most personal. For years after he opened the gardens and the museum to the public, H. F. duPont kept his house to himself, landscaping it with plants that he loved and which, since he spent summers on Long Island and winters in Florida, would be at their best from September until Christmas and from early spring until June. Here the most arresting plant is a huge hybrid magnolia, *M.* x *veitchi,* growing against the house, its pink blossoms the size of dinner plates. Across the stream, which flows nearby, is a tall specimen of the elegant yulan, *M. denudata,* with pure white flowers. Both bloom in early April. Flanking the steps leading up to the terrace are specimens of *Elaeagnus pungens* and *Osmanthus ilicifolius,* both of which perfume the air in October and November. On the terrace are camellias that bloom either in November or March; a hawthorn whose berries are brilliant red for most of the winter; *Euonymus bungeana semipersistens,* a slender tree with weeping green branches whose chief interest is its foliage, which persists until early winter and turns a strange pinkish white before falling; and a winter-flowering Chinese witch-hazel. At the front door are banks of dwarf evergreen Satsuki azalea, always interesting in habit and foliage but absolutely spectacular in June, when their enormous, variegated flowers open.

Thus we complete a trip around the garden, and, just as when I have completed an actual tour, I am distressed that I failed to point out so many interesting things—a gorgeous sapphireberry near the corylopsis planting; swamp cyrilla, wheel tree, and *Mahonia pinnata* in the Quarry; *Cornus racemosa* on Oak Hill. Which only emphasizes the fact, I suppose, that whatever one's purpose in visiting Winterthur, s/he always leaves with the feeling that there is simply too much richness and variety to take in during a single day.

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Some Plants at Winterthur

Listed below are some of the plants and locations in this article:

HEATHER BED
Asclepias tuberosa
Bruckenthalia spiculifolia
Calluna vulgaris
Colchicum sp.
Diervilla x *splendens*
Erica carnea
E. tetralix
E. vagans
Indigofera sp.
I. incarnata alba
I. kirilowi
Leptodermis oblonga
Lycoris squamigera
Scilla scilloides
Spiraea x *billiardi*
S. douglasi
S. japonica
S. x *lemoinei alpestris*
S. x *margaritae*
S. x *sanssouciana*
Vaccinium vitis-idaea

SUMMER SHRUB GARDEN
Acer griseum
Albizia julibrissin
Buddleia davidi
B. x *pikei* 'Hever'
Ehretia thyrsiflora
Hibiscus syricus
Hydrangea paniculata
Stewartia koreana
Viburnum 'Willow-wood'
Vitex agnus-castus

FERN AND PEONY GARDENS
(near Pagoda or Mushroom Seat)
Azalea Magnifica
Dryopteris erythrosora
Paeonia lutea ludlowi
Pterostyrax hispida

AZALEA WOODS
Anemone apennina
Rhododendron fargesi
R. fortunei
R. kaempferi
R. sutchuenense
R. vernicosum

BEYOND THE AZALEA WOODS
Azalea Magnifica
Enkianthus perulatus
Magnolia x *soulangiana*
Scilla amethystina
Spiraea cantoniensis cv. Lanceata

ACROSS THE ROAD, NEAR MAGNOLIA
Acer palmatum cv. Dissectum
Cornus florida cv. Pluribracteata
Prinsepia sinensis
Rhododendron pentaphyllum
Syringa laciniata
Viburnum henryi

PINETUM AND ITS PERIPHERY (4 on the map)
Abies homolepsis
Bergenia spp.
Chamaecyparis spp.
Corydalis bulbosa
Corylopsis pauciflora
C. spicata
Helleborus niger
H. orientalis
Libocedrus decurrens
Picea torano
Pinus parviflora
Primula abschasica
Rhododendron mucronulatum
Sciadopitys verticillata
Thuja standishi

WHITE GATE
Exochorda giraldi
E. racemosa
Kerria japonica
Staphylea colchica

SUNDIAL GARDEN (6)
Lonicera pileata
Ribes aureum
Xanthoceras sorbifolium

SYCAMORE AREA (7 and 8)
Ceanothus x *pallidus roseus*
Cornus controversa
Cornus sp.
Cytisus battandieri
Deutzia sp.
Magnolia sieboldi
Philadelphus spp.
Stewartia sp.
Styrax obassia
Syringa pekinensis
Virburnum dilatatum cv. Xanthocarpum

PRIMULA QUARRY
Clethra barbinervis
Coriaria japonica
Cornus officinalis
Corydalis cheilanthifolia
Lonicera nitida
Lysichiton americanum
Photinia villosa
Pieris 'Forest Flame'
Primula sp.
Rhododendron makinoi
R. yakusimanum 'Exbury'

WALK FROM QUARRY TO OAK HILL
Rhododendron amagianum
R. prunifolium
R. weyrichi

OAK HILL
Deutzia chuni
D. chuni cv. Magicien
D. x *magnifica latiflora*
D. x *wilsoni*
Syringa emodi
S. julianae
S. meyeri
S. reflexa
S. wolfi

FROM OAK HILL TOWARD SUNDIAL
Clethra acuminata
Primula elatior
Trillium chloropetalum

MUSEUM AREA
Davidia involucrata
Hamamelis mollis
Ilex centrochinensis

MARCH WALK
Adonis amurensis
Erythronium albidum
E. citrinum
E. grandiflorum
E. hendersoni
E. japonicum
E. revolutum
Galanthus elwesi
G. byzantinus
Leucojum vernum

NEAR H. F. duPONT HOUSE AREA
Elaeagnus pungens
Euonymus bungeana semipersistens
Magnolia denudata
M. x *veitchi*
Osmanthus ilicifolius
Azalea Satsuki
Rhododendron indicum

how worried should we be about our shade trees?

If you are depending on an American elm for shade you've got plenty to worry about. I'm sure I don't need to remind anyone of that. Other shade trees have varying amounts of risk associated with them. Stress, for example, is a major factor in tree diseases. A tree that is weakened by drought, insect defoliation, excessive cold, misuse of chemicals, soil compaction, or mechanical wounding is much more likely to be invaded by pathogenic organisms than is a tree that has not been subject to stress.

Dutch elm disease, caused by the fungus *Ceratocystis ulmi,* has taken its toll of American elms in much the same way that the chestnut blight fungus, *Endothia parasitica,* decimated stands of native chestnut in the early 1900's. In the case of Dutch elm disease the causal fungus is spread from infected trees to healthy ones by direct root contact or by the elm bark beetle. Control may be aimed at the fungus itself or at the beetle. Recently developed techniques for control of Dutch elm disease involve yearly injections of a fungicide into the trunks of elm trees. This technique, when coupled with rapid removal of any branches showing disease symptoms, has been moderately successful in prolonging the life of mature elms. However, because the chemicals inhibit but do not kill the ceratocystis fungus, injections must be repeated every year. The treatment is practical only for highly valued specimen trees. Efforts are being made both in this country and in Europe to breed new elms resistant to Dutch elm disease, but so far it has been difficult to combine the traditional elm form with an acceptable level of disease resistance.

Even if you manage to protect your elms from Dutch elm disease your worries aren't over. Elm *Phloem necrosis,* although not as widespread as Dutch elm disease, is a potential threat. The causal agent of this disease is a mycoplasma-like organism (MLO), similar to a bacterium without a cell wall. There is no direct treatment for elm *Phloem necrosis* but it is possible to control the leafhopper, which is responsible for transmitting this disease. To be effective a spray program must be so thorough that not a single leafhopper that has fed on a diseased tree survives to feed on a healthy tree. The same principle applies to efforts to control Dutch elm disease through control of the elm bark beetle.

While not itself a direct cause of tree death, unless it occurs repeatedly, defoliation weakens a tree by depleting carbohydrate reserves.

Oak wilt is also caused by a fungus of the genus ceratocystis, *C. fagacearum.* Oak wilt, however, does not seem to pose a serious threat to shade trees in the Delaware Valley area. This disease was most prevalent in Pennsylvania during the late 1950's and early 1960's when extensive periods of dry weather are believed to have increased the susceptibility of forest trees. It has not yet been found east of the Susquehanna River. Individual trees are usually killed by oak wilt with the red oaks as a group more susceptible than the white oaks. There is no treatment for an infected tree. The Pennsylvania Bureau of Forestry prevents the spread of oak wilt by removing diseased trees and all other oaks of the same species within a 50-ft. radius.

continued



by Ann F. Rhoads

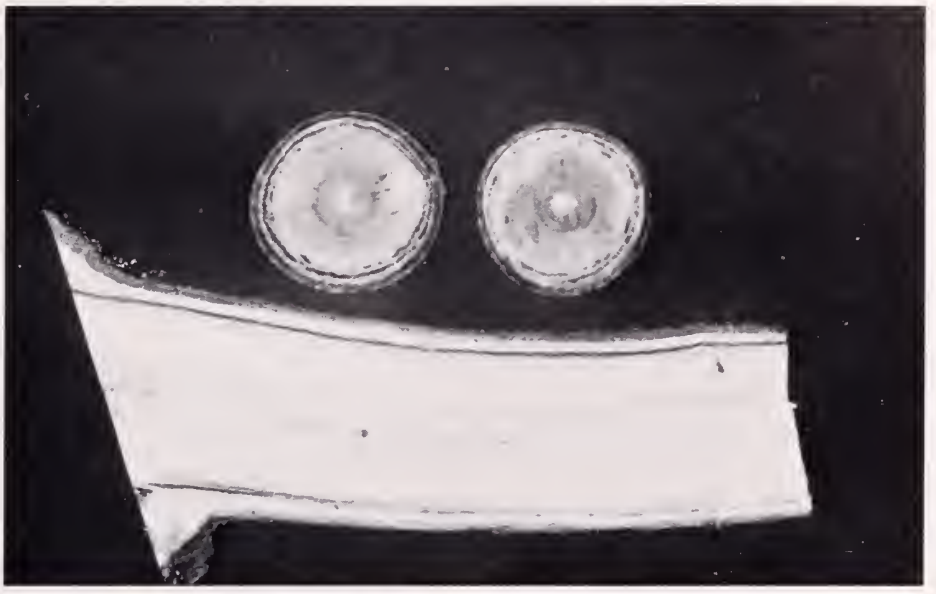
Ann Rhoads completed work on her Ph.D. in plant pathology at Rutgers University in June 1976. She is now plant pathologist at the Morris Arboretum in Chestnut Hill. She makes her home on a "farm" in Bucks County where the major part of her spare time is spent gardening.



photos by Spencer H. Davis

At left, the ginkgo trunk wound is properly prepared for rapid healing.

Below, verticillium wilt: sapwood discoloration of maple









These three photos show symptoms of anthracnose on mature platanus leaf, twig canker and young oxpawling leaves.

If your shade trees are maples you may have reason to be worried. Verticillium wilt is a serious threat to members of the genus *Acer.* Norway maple, silver maple, sugar maple and red maple are all susceptible. *Verticillium alboatrum,* the fungus that causes this disease is soil borne and enters the tree through the root system. Because of this mode of entry and the nature of the infection that occurs deep within the vascular system of the tree no control measures have been devised. Verticillium wilt can kill a mature Norway maple tree within a few weeks of the first visible symptoms, or a tree may decline over a period of a year or more. In some cases only a single branch or side of the tree may be affected and recovery is possible. Quick removal of wilted branches should be carried out. Trees subject to road salt or other stress factors are more susceptible to verticillium wilt than non-stressed trees. Recently interest has been expressed in breeding verticillium-resistant maple lines; however, this will not be a reality for some years because tree breeding and selection is a long process. It is possible that verticillium-resistant trees could serve as root stock to which scions with desirable branch and foliage characteristics could be grafted.

Maples are not the only trees affected by verticillium wilt. Mimosa, linden, elm, catalpa, ash and other woody plants and weeds are also susceptible. Because the fungus remains viable in the soil for years, care should be taken to replace a dead tree with one not susceptible to this disease.

Sycamore *(Platanus occidentalis)* and London plane trees *(P. acerifolia)* have their problems too. Anthracnose, although widespread, is rarely fatal. This fungus disease varies in severity depending on the weather conditions. In a cool, wet spring it can cause extensive damage to young expanding leaves and may be confused with damage caused by a late frost. Later in the season leaves appear scorched along the veins. The fungus that causes anthracnose, *Gnomonia platani,* winters over in twig cankers, which cause terminal dieback and a tufted appearance to severely affected branches. Anthracnose is a universal problem on platanus; good cultural practices including fertilizing and watering when appropriate are probably the best course to take in countering this disease although spraying can directly control the fungus. The native sycamore is more susceptible than London plane.

Another fungus of the genus ceratocystis, *C. fimbriata,* is the causal agent of the canker stain disease of platanus. In this case London plane is somewhat more susceptible than the native sycamore. Canker stain is easily transmitted from diseased trees to healthy ones by contaminated pruning tools. There is no control other than rapid removal of diseased portions.

Many beautiful old European beech *(Fagus sylvatica)* and American beech *(F. grandifolia)* grace the grounds of properties in the Philadelphia area. Fear has been expressed regarding threat to these trees from beech bark disease. The native beech in forested areas has been attacked by this disease, which is spreading into northeastern Pennsylvania from New England. Beech bark disease has two phases; the first involves invasion by the beech scale *(Cryptococcus fagi)* which is easily recognized by the white cottony exudations it produces on the trunks and branches in late summer. Attack by the scale is followed by infection by a fungus *(Nectria coccinea* var. *faginata)* through the feeding wounds. Valuable specimen trees should be watched and scale infestations dealt with immediately using the appropriate insecticide applications.

A major problem with beech trees is the inability of these trees to tolerate soil compaction, construction related damage to the root system, or pavement placed over the root zone. Beech is a native of the northern hardwood forest, its root system is shallow and fibrous. Trees subjected to root system insults soon show leaf scorch and dieback, which often progresses to a general decline of the entire tree.

A major problem with beech trees is the inability of these trees to tolerate soil compaction, construction related damage to the root system, or pavement placed over the root zone. Beech is a native of the northern hardwood forest, its root system is shallow and fibrous. Trees subjected to root system insults soon show leaf scorch and dieback which often progresses to a general decline of the entire tree. All efforts should be made to keep the ground surface under beech trees free of soil compaction, grade changes or other disturbances.

I have made a number of references to the problem of stress in tree disease incidence. Insect defoliation such as that caused by the gypsy moth larvae is an important source of stress for trees. While not itself a direct cause of tree death, unless it occurs repeatedly, defoliation weakens a tree by depleting carbohydrate reserves. The result is that the tree becomes susceptible to pathogenic organisms that are not able to gain a foothold in a vigorous, healthy tree. Drought and flooding also weaken the tree as does high salt concentrations in the soil. Mechanical wounding is another way for tree pathogens to enter. Breaks in the trunk or roots should be cleaned and shaped in such a way as to promote rapid healing. Pruning cuts should be made properly to avoid leaving dead branch stubs.

If after this recital of shade tree problems you are worried about your choice specimens, you can take some measures to reduce or avoid unnecessary stress. I hope I've given you some ideas along these lines. A healthy, vigorous tree is your best insurance against serious disease problems. One additional suggestion I would like to make concerns new plantings of shade trees. I would recommend that a variety of species be used in a planting whenever possible to avoid decimation by a single disease organism or the build-up of large insect populations. Furthermore it will be desirable in selecting new shade trees for planting to take advantage of disease-resistant lines as these become available. In the past, tree selections for distribution in the commercial nursery trade have mainly been based on form or color or other ornamental characteristics, and factors such as disease resistance or stress tolerance have all too often been ignored.

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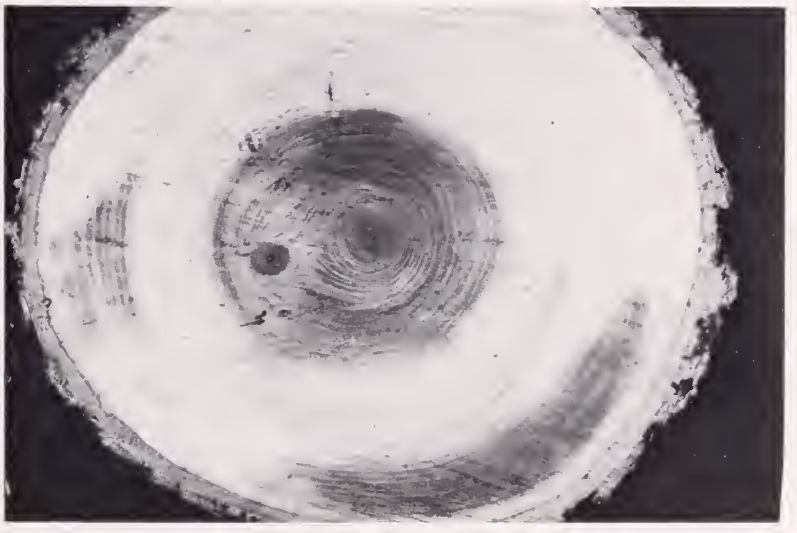


At left, oak wilt. Late stage showing sucker growth along trunk. Red oak.

Below, anthracnose symptom on sugar maple leaf







Above, discoloration of outer rings of wood in a branch from an elm infected with Dutch elm disease.

At left, brood chambers of the elm bark beetle in a bark sample from an elm infected with Dutch elm disease.

The Penn Treaty Elm on Haverford's

A monarch tree of historic significance is engaged in a life and death struggle. No ordinary tree, this American elm is the only authenticated descendent of the historically famous Penn Treaty elm. Under that Treaty elm William Penn and the Leni-lenape Indians declared an enduring peace that helped shape the future of our new nation. Now its direct descendent stands before Founders Hall at Haverford College — a skeleton ravaged by disease and the severe measures used to treat it.

When I first saw Haverford's historic elm over a quarter of a century ago, I was impressed with its size, graceful branching and deep canopy of leaves. Its limbs had been supported with cables and a lightning rod set in its topmost branch to protect it against the elements. It towered over neighboring beeches and oaks—truly what Andre Michaux, eighteenth century French botanist, had described as "one of nature's noblest." Its historic significance made us more deeply aware of our rich heritage. One was impressed with its seeming indestructibility. We knew the Dutch elm disease, introduced into this country in 1930, was killing upwards of a million elms each year. Surely an elm of such majestic stature and regal heritage would not become a victim.

Even then the battle for survival had begun. Each year the struggle intensified. Plant pathologists throughout the world joined the fight to save the elm from the dreaded disease. Leaf and bark beetles, known carriers of the Dutch elm fungus, were defoliating its branches each spring, forcing the tree to produce a second crop of leaves. The chemical DDT effectively controlled the beetles but the Federal Environmental Protective Agency banned its use in 1972 as potentially harmful to other aspects of the natural environment. Without proper beetle control the Penn Treaty elm was soon infected. Leaves on some branches wilted, curled and turned yellow. Shortly thereafter, the fungus blocked the passage of water, eventually killing the branch. One by one the branches had to be removed and burned. As symptoms of the disease appeared with greater frequency, efforts to combat it intensified.

Under the direction of John Hansel, executive director of the Elm Research Institute in Harrisville, N.H., Richard Campana of the University of Maine, and Francis Holmes of the University of Massachusetts, battle lines were drawn. Since then the Penn Treaty elm has been severely pruned, stripped of much of its bark, sprayed, fed and injected with chemicals in an honest effort to support the tree's gallant fight for survival. The chemical, Benlate, gave promise of control but failed finally. Today, a duPont product, Lignasan, is proving to be an effective combatant. Now there is hope for the dwindling elm population but little hope for our revered Penn Treaty elm. Ravaged by disease and sacrificial measures in the guise of research it stands proud, engaged in a slow death that others might live. Its seedlings grow on in the college nursery, straight and tall, a bearing appropriate to descendents possessing the genes of one of Pennsylvania's most famous trees.

The family line of the Penn Treaty elm will go on. The American elm will survive. We now have, in Lignasan, a control for Dutch elm disease. While we sorrow for the destruction of our beloved elms in this generation, we rejoice that a new generation of seedlings will, in future years, arch above the campus as reminders of the regenerative forces in creation.

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by Stevenson W. Fletcher, Jr.

Stevenson W. Fletcher, Jr., a registered landscape architect, is the director of the Haverford College Arboretum.



Campus

are american elms obsolete?

The Elm Research Institute is bullish on planting elms these days. A call to New Hampshire just as we went to press revealed that you can plant American elms now and expect them to live out their normal life span up to 100 years IF they are cared for properly. Proper care includes removing all dead or dying elm trees from the area and burning them. It also means spraying annually with methoxychlor before the leaves unfurl. At this point in time, ERI recommends injections when the tree reaches approximately 12 in. in diameter (10-12 years). ERI anticipates that chemotherapy will be an outmoded form of treatment in the near future. We'll keep you advised about the possible restoration of these beautiful trees in the landscape.



photo by Charles F. Ward, Jr.

Young People and Gardens:
A WINNING COMBINATION

by Nina Gomez-Ibánez

In 1974 Nina Gomez-Ibánez took over direction of the "Grow-It!" program from PHS; it had been originated in 1965 by PHS. She is the former supervisor of education at Morris Arboretum.



photos supplied by the Morris Arboretum

Weighing produce

"Beans!!"

That exuberant summer cry comes from several spots in our one-acre children's garden area at the Morris Arboretum. The young gardeners are not just discovering their first ripened crop on that early July day, they are also beginning to experience a deeper kind of satisfaction that comes from knowing they are true partners in this miracle of growth. Shouts of "Aphids!", "Rabbits!", and "Someone stepped on my lettuce," whether angry, surprised, or joyful, constantly punctuates the interaction between the children and their gardens.

What's so special about a children's garden? After three years working with our "Grow-It!" program, I am convinced that a unique learning situation exists there, not to be found at a nature camp or in the family garden at home. A child who tends a plot of ground in his or her own backyard certainly benefits by the experience, but often the conditions are not ideal for a successful garden, and parents may be overly helpful or too critical. Also, the young gardener may have no peers with whom to compare his or her successes and failures. "Grow-It!" offers 50 children the opportunity to garden together from April to October, on individual (16 ft. x 20 ft.) plots, with professional supervision and a host of enriching activities to take part in.

Biological science, the environment, horticulture: concepts learned from one's garden can reach into all of these areas. A concept of plants in time and space is perhaps the most difficult to form for a first time gardener. It is difficult to picture a full grown tomato plant if you have never raised one before. And, some children find it hard to imagine a whole season's growth when they expect full grown edibles in two weeks. We distribute the first radish, lettuce, and carrot seeds in early April. Small groups of children are instructed in soil preparation and proper planting technique. However, in the ensuing zeal of starting the gardens, Sam and Rebecca sowed their seed at about 20 per inch instead of one or two per inch. They were delighted with their tightly packed rows of green in the coming weeks until they realized

Jon found a dead bee near one of his blossoms. The idea that he had interrupted the beneficial cycle of pollination shocked him.

the need for thinning. Hours of painstaking pinching and pulling quickly convinced them that they must estimate the plant's mature size more realistically when planting.

What better place to study size and shape than in one's own garden? A prize for the tallest sunflower prompted a great deal of ingenious measuring systems, not to mention elaborate staking and protective systems for the huge plants. Even the twisted or odd-shaped ("weirdos") were awarded originality prizes in our Harvest Show, where size, shape, color and texture were critical in the appealing display of vegetables.

Awareness and observational skills are called into play daily in a child's garden. Jill, one of our advanced gardeners, had noticed Mexican bean beetles beginning to eat her beans. After trying valiantly to discourage them by non-chemical means, she decided to ask for an insecticide. Before her garden was sprayed, however, she noticed something important. The purple pod variety did not seem as affected as the yellow or green snap beans. She promptly planted successive crops of the purple pod beans, and her example was followed by others with good results and without spraying.

One's patience is often tried or at least stretched by the growth process of a garden, especially if you are a child who has not had to wait long for food

continued



A step ladder is needed to reach the top of Grow-It sunflowers.



Using old tools

at home. Eleven-year-old Sean increased his patience well as his observational skills when he grew a cantaloupe. No other children had melons and he was most anxious to get results. The drama increased over the summer as Sean watched other people's cucumbers withering with a bacterial wilt and zucchini collapsing with squash vine borers. As his melon plant began to yield fruit, he mulched it and tended it and watched it. He stuck with it until all traces of green had left the rind and felt to check that the blossom end was slightly soft. School had started, and the vine had begun to die when Sean came back to pick his cantaloupe. His patience and keen observation paid off with every juicy bite.

Throughout the summer the children's awareness of how plants grow is coupled with an understanding of how plants can be used. One group experimented with natural dyes from sumac, dock, pokeberries and onion skins. Another group ground grains into flour and baked delicious loaves of bread. Some made wooden stools and birdhouses. They learned how to can tomatoes and freeze beans, and their gardens became linked directly to their families. These activities, besides being useful and fun, broke up the monotony of a non-stop gardening day.

As each gardener deals with his plot of land, he begins to see that all living things are interrelated, and that he can play a very influential part within that system. Jon wanted a good crop of squash and had decided to spray his plants with methoxychlor to prevent the vine borers that killed his crop last summer. Some time after spraying, he found a dead bee near one of the blossoms. We had been studying our own four colonies of bees at the Arboretum and their role in pollination. The idea that Jon had interrupted this beneficial cycle shocked him, and he became more and more interested in both the harmful and helpful insects.

It is made clear at the outset that the survival of the garden depends solely on each child; parents are not allowed to help except on one special "Family Day."

The children's own development in the garden program is perhaps the most appealing aspect of all. First, there is a sense of partnership throughout the growing season. All the gardeners are coping with the same soil conditions, drought, flood, heat and animal pests. How they choose to deal with the elements is an individual matter, but they all begin on the same equal ground. Sharing is a necessity and becomes routine. Even the shyest boy or girl must speak to his neighbors to share a wheelbarrow, or to get friendly advice. Often we set up garden teams to help get the weeding done in individual plots that need a boost. The gardens are then judged and the team of ten gardeners scoring highest wins a watermelon or some equally delectable reward.

Bringing home fresh vegetables daily tends to build self-confidence in each



Liz with carrot



Flower arranging

young farmer. Their offering is not art work brought home from school to be hung on a wall or eventually tossed in the trash. It is food that will most likely find its way to the dinner table where the whole family can see it, eat it, and react to it. One girl's parents were so pleased by the new vegetable supply that they purchased a new freezer, giving added incentive to their daughter to try even harder in her garden. Some families are not used to such a variety of fresh vegetables, and their reation is sometimes less than encouraging. A mother might say, "Ohhh . . . How nice . . . Swiss what?" as her child brings in an armload of bright red and green chard. Printed recipes and cooking demonstrations for which the youngsters gather the ingredients are always successful. The garden offers many ways to build up self-confidence and culinary creativity through the food produced in it.

A children's garden program can build a greater sense of responsibility through day to day garden and tool care. It is made clear at the outset that the survival of the garden depends solely on each child; parents are not allowed to help except on one special "Family Day." The care and protection of a set of tools is also their sole responsibility throughout the season. It is encouraging to see how conscientious they become about returning tools to storage, and remembering to weed, water, and harvest before going home every day.

Creativity is another personal outgrowth that we have experienced in the "Grow-It!" program. The gardens often show a unique planting style which varies from the standard plan given to all gardeners in the spring. David chose to be creative with mulches. Though he followed the regular planting plan, he applied alternating strips of dark leaf mold and light straw along the rows of plants. This was his stamp of uniqueness, and also enabled him to experiment with two mulches in an orderly way. Others created interesting patterns and shapes with their flower beds. Still other advanced gardeners created an entire plan of their own, complete with a homemade scarecrow.

The essentials of a garden program are reasonably good soil, full sun, water, shelter, tools and parking or nearby public transportation. These are the first needs to consider when beginning any community or children's garden, but they are not impossible to solve. At the Morris Arboretum, we have a great many "extras" at hand, such as a tropical fernery, rock wall, greenhouse, and many other kinds of gardens for the young people to experience. But these are secondary to the main activity of tending a vegetable garden from the first warm days of spring to the first killing frost.

The children's own experiences, as outlined here, illustrate some of the benefits of such a program, no matter where it may be located. In so many personal, physical, and educational ways, these young farmers grow with their gardens, and the greater community benefits by that growth.

●



dear editor

Letters to the Editor:
The November issue of *Green Scene* seemed to provoke more letters (and longer ones) than any other issue. We enjoyed them so much, we thought you might like to have these addenda to the articles printed in that issue. The Editor

Walnuts

Tell Alexander Crosby his piece on walnut trees was a delight. In many ways, walnuts are a nuisance. But there may be one aspect, one benefit, he doesn't know. At least he doesn't mention it. Walnut trees are the greatest natural lightning rods. The very sap of walnuts, which deters the growth of so many plants and shrubs, is a superb electrolyte. This, coupled with the natural candelabra configuration of walnut branches draws lightning to them like a magnet. Here in the country, the old tradition was to always grow a walnut next to any farm structure to draw off lightning. It works, too. In 30 years, we've had walnuts around our house and never have been struck. Other houses, even when they had other tall trees around them, but had no walnuts, were struck regularly.

Edwin A. Peeples
Phoenixville, Pa.

Mushrooms

This letter is in response to Edwin A. Peeple's comment in his excellent article on mushrooms, "A Mushroom Adventure." There may be other ways to cook *Coprinus cornatus.*

After struggling for years with chalky, inky results when trying to serve the supposedly delectable coprinus, I came across a recipe for them in an old mushroom book (the book is in my summer house and I will send a photocopy of the recipe along to you next summer). It has made all the difference in the world.

First of all, one should pick only those coprinus whose cap is completely attached to the mushroom stem. This means picking those caps that have just emerged above the ground. Once the stem shows above ground as well as the cap, it may be too late and when it is leggy it is hopeless. These firm young caps keep quite readily (that is at least until the next meal) and there is no need to rush them into the pot.

The second key step in cooking coprinus is first to blanch the caps briefly. This completely stops the inky business and preserves the cap's pristine white form.

Finally, rather than sauté them, they should be almost poached in gently simmering butter.

The result of this treatment is one of the most delectable of all mushroom dishes. Bon appetit!

Francis H. Cabot
New York City

Poison Plants

As postlude to Robert F. Lederer's superb and timely article in the Nov/Dec issue on so-called poisonous plants, your readers may be amused to be reminded of the most famous indirect poisoning-by-plants-with-a-happy-ending in history.

It occurred in 400 B.C. and is reported in Xenophon's *Anabasis.* After the 10,000 Greeks reached the Black Sea they were opposed by, defeated and occupied the villages of the Macrones. Xenophon writes (Dakyns translation):

"Here, generally speaking, there was nothing to excite their wonderment, but the numbers of bee-hives were indeed astonishing, and so were certain properties of the honey. The effect upon the soldiers who tasted the combs was, that they all went quite off their heads, and suffered from vomiting and diarrhoea, with a total inability to stand steady on their legs. A small dose produced a condition not unlike violent drunkenness, a large one, an attack very like a fit of madness, and some dropped down, apparently at death's door. So they lay, hundreds of them, as if there had been a great defeat, a prey to the cruellest despondency. But the next day none had died; and almost at the same hour of the day at which they had eaten they recovered their senses, and on the third or fourth day got on their legs again like convalescents after a severe course of medical treatment."

It is now generally agreed that the shrub on which the bees had fed was *Rhododendron ponticum.* And it is reported that to this day the inhabitants of the region avoid this honey.

George Elbert
New York City



engravings from *The Art of Beautifying Suburban Home Grounds of Small Extent*

Stalking the 19th Century Gardens

by Julie Morris

We don't think of a horticultural library as the setting for a mystery, yet finding information on certain subjects does take some sleuthing. An odd grab bag of clues recently helped the library staff to unravel some of the mystery surrounding our immediate gardening past, the late nineteenth and early twentieth centuries. The bits of information leading to the solution were a query from the Curator of Parks in New York City, a pile of musty old photographs, a chance find by a Longwood student and a little black box.

Ironically, we had only scattered fragments of material to use when researching an era much closer to us in time than the colonial period of gardening, for which a good amount of literature has been compiled. Today, as Victorian houses and gardens are being restored, more and more people are becoming interested in the years between 1870 and 1920. That was a time of grand living and great wealth in America. Gardening styles were diverse and a seemingly endless variety of plant material available.

The search for turn-of-the-century gardening information started with a question from the Curator of Parks in New York City. He stopped by one day a few years ago to ask if we had any photographs of Philadelphia gardens in the early 1900's. As far as I knew, we had only the pictures in one or two books illustrating the work of Philadelphia landscape architects with whom he was already familiar. But a short time later we discovered in the library's gallery a collection of photographs of area gardens *circa* 1900. However, neither the gardens nor the photographer could be identified. Then a year or so ago the library was given another set of photographs of that same period, obviously photographed by the same person. This time both the gardens and the photographer, Ida Pritchard, were identified. The collection now in the PHS archives is a valuable research tool. Photographs much more than any description in books give the most accurate record of the way it was. Fortunately for researchers working on the Victorian period of gardening there are both still and motion pictures available. One restoration project in the Midwest has relied principally on an 1920's home movie made of a birthday party to identify the design of the garden under restoration. Stills made from different parts of the movie provided information on garden statuary, pools, paths and the kinds of plants, both woody and herbaceous, used in the garden.

One restoration project in the Midwest has relied principally on an 1920's home movie made of a birthday party to identify the design of the garden under restoration.

After the Pritchard photographs surfaced, other clues to gardens and gardening at the turn of the century began to appear. A Longwood student working on the history of the suburban garden came across a bibliography on landscape architecture up to 1934. The bibliography compiled by Katherine McNamara, librarian to the Harvard School of Landscape Architecture, is the most complete for its time and subject. It refers to periodicals and to books and is divided by country. Further division into more than 20 subjects with subheadings make the bibliography valuable for research. The original copy of the reference may be used in the PHS library; however, we have made a xerox copy available to circulate to members. The McNamara bibliography was really the key to sorting out the information about the period in question when we realized just how much material was still available first hand.

At first glance the library's card catalog seems to offer very little help since not very much has been written about the Victorian era of gardening in America. However, thanks to Katherine McNamara, a further search revealed the exciting fact that the catalog lists hundreds of books written between 1870 and 1920, that still circulate from the library or are readily available for reference in the Special Collection (see *Green Scene,* Vol. 3, No. 3).

Following is a brief discussion on some of the material that has been most interesting and helpful to me.

Jacob Weidenmann, superintendent of the City Park and Cedar Hill Cemetery of Hartford, Connecticut, prepared a handsome color plate book in 1870, *Beautifying Country Homes: A Handbook of Landscape Gardening.* Orange Judd who published much of the horti-

continued



cultural literature of the period was publisher. Weidenmann's book is in two parts. The first part covers 40 pages of landscape suggestions, including preparation of lawns and drives, ornaments, water and rock gardening, 24 subjects in all ending rather ominously with hints on burial plots. The second part of the book contains plans of "improved places." Twenty-two estates and two parks are illustrated. There are gardens from several states including Pennsylvania, Ohio, Connecticut, New York and Rhode Island. Plant lists are given with each plan. Much of the plant material that Weidenmann listed was exotic, the results of the golden age of the plant hunters. The author, however, does include this caveat: "No one ought ever to select a tree or shrub merely for its pleasing or novel name."

People interested in the work of Frederick Law Olmstead, designer of Central Park, will find two of his plans for small city parks included.

Frank J. Scott wrote *The Art of Beautifying Suburban Home Grounds*, first published in 1870 for "persons of moderate income, who know little of the arts of decorative gardening." Scott dedicated his book to Andrew Jackson Downing, perhaps the first American to write about suburban gardening, and Downing's untimely death in 1852, in Scott's words, "robbed us of his pleasant genius in the prime of its usefulness."

Suburban Home Grounds includes over 200 plates and engravings of garden plans, trees and shrubs and garden ornaments. Scott's work is a complete guide to gardening and landscape design of the Victorian era in America. Extensive plant lists, comparisons of tree and shrub characteristics, descriptions of deciduous and evergreen trees and shrubs in addition to the virtues of vines and creepers make up over one-half of this 600-page book. Each plant is described at some length and, in many cases, Scott included the location of a particularly handsome specimen: a lovely halesia in Central Park, an osage orange in John Bartram's garden, a specimen dogwood in Germantown or a spectacular paulownia in a cemetery near Philadelphia. These odd bits of information about plants of special note are of great use to anyone compiling a list of notable plants and their location in the last century. Plans for every shape and size suburban lot are given, from the most commodious to the barest corner. Scott includes suggestions for renovating old places, as fashionable a project in 1870 as it is today. Every garden plan included space for a cutting garden, a vegetable garden and if there was enough room, an orchard, in addition to the ornamental planting around the house itself.

There are entertaining sections of the foibles of garden fashion of the times. Scott writes about the British-born addiction of Americans for creating parks out of the grounds surrounding their houses causing the "isolation and loneliness of the habitual inmates of the house." He writes: "It would be well for our progress in Landscape Gardening that this word park, as applied to private grounds, should be struck out of use, and that those parts of our grounds which are devoted to what feeds the eye and the heart, rather than the stomach, should be called simply *home-grounds.*" Scott was a keen observer of the trends in building styles: "There is an unfortunate tendency among our countrymen who are building houses, to be willing victims of some fashionable mania pertaining to architectural styles." Anyone restoring a house or garden of the last part of the nineteenth century will have her task made easier by reading Scott. The lesson learned is not to take it all so seriously. In his short but excellent discussion of color, Scott chides his readers about the "parrots of fashion" who suddenly painted everything brown after white went out of style as a house color.

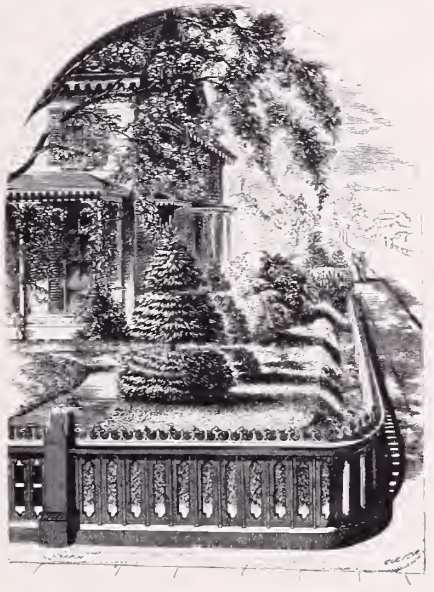
Periodicals almost forgotten on the library's shelves have been rediscovered as the mirrors and trend-setters of garden design at the turn of the twentieth century. The advertisement and articles provide information on what plants were available and how people used

"It would be well for our progress in Landscape Gardening that this word park, as applied to private grounds, should be struck out of use, and that those parts of our grounds which are devoted to what feeds the eye and the heart, rather than the stomach, should be called simply *home-grounds.*"

them in their gardens. Magazines such as *Garden and Forest,* published between 1888 and 1897, included additional reading suggestions at the end of most articles, more bibliographic help for the researcher.

Seed and nursery catalogs of the period are very useful in garden restoration. The library has a good collection of catalogs from the last 100 years, including Andorra Nursery, Buist, Burpee, Dreer and Landreth, all Philadelphia area businesses.

Perhaps the most intriguing source of help illustrating Philadelphia gardens of the early 1900's was contained in that little black box mentioned earlier. In 1938 Emily Read Cheston worked on a glass slide presentation for a meeting of garden clubs planning tours of Philadelphia area gardens. The hand-colored slides were made between 1916 and the early 1930's. Each slide is identified and most are accompanied by descriptions written by Mrs. Cheston. There are well over 100 slides in the collection. A few months ago we had most of the slides converted to 35mm transparencies that will eventually become part of the slide sets available for rent from the library. We are hoping that someone will take on the project of finding out the fate or recent history of the gardens depicted in the glass slides. The allees of tubbed orange trees that once graced an estate in Neshaminy are gone as is the rest of the estate. Most of the great park-like gardens designed in the English manner on Philadelphia's Main Line have disappeared, lakes, swans and all. But we do have their images and many more as a permanent part of the library's Victorian collection. We can look back through all the material mentioned in this article as well as much more that the library has to offer and see how America's somewhat eclectic gardening style developed. The extremes in fads and fashions of turn-of-the-century gardening were practiced with a good bit of humor and I think that it is unfortunate that such foibles are taken so seriously by many garden historians today.



The ability of our gardening predecessors to see humor in their gardening trends was a very endearing trait.

Julie Morris is a garden consultant with a special interest in garden resotration. Until recently she was the PHS horticultural librarian; she now lives and gardens in Newport, Rhode Island.

Reading List

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*can circulate

sansevieria sp.

One of my sansevieria is about 10 or 11 years old. Last spring, for the first time I put it out on my screen porch where it gets the morning sun for a few hours. I watered it once a week and fertilized it once a month. Although I handled all of the other sansevieria in the same way, only this particular one bloomed. The flower stalk was about 1½ ft. tall covered with delicate flowers about an inch across, exuding a lovely aroma—similar to Easter lilies (sansevieria is a member of the Liliaceae family). The stalk lasted for about a month. Unfortunately it closed during the day but came into bloom about 8 or 9 o'clock in the evening.

Ruth R. Fairfield

Ruth R. Fairfield has had a plot to garden since she was four years old. She lives near Morristown in New Jersey and is interested in house plants as well as flower and vegetable gardens.

schizophragma hydrangeoides

Vines have long been overlooked in American gardens, their versatility and adaptability have never been fully appreciated. A most distinctive and well suited vine for northern gardens is *Schizophragma hydrangeoides* or false climbing hydrangea. It is native to Japan where it grows on tree trunks often in association with *Hydrangea petiolaris,* which indicates similar cultural needs. We don't know exactly when it was introduced into western gardens, but we believe it was around 1880.

Climbing by aerial roots it adheres to surfaces; therefore, it is best used on stone, concrete surfaces or tree tunks. Its growth habit is similar to climbing hydrangea but yet they are distinctively different plants. Leaves appear first followed by flowers, which are formed on last year's wood. There are two types of branching on the vines, vegetative and flowering. The leaves remain the same on both types of branching, differing from hedera where leaf shapes change when the plant begins to form flowering branches.

The two types of growth are distinctive and easy to recognize. Vegetative growth is flat against the climbing surface. Flowering branches extend away from the surface and occasionally should be pruned back to prevent ice and snow loads from bringing the vine down off the growing surface. Prune flowering wood directly after flowering. Vegetative growth should be pruned in late winter or early spring, so that subsequent growth can be guided to suit the situation and needs of the garden. If the vine should come off the growing surface, it should not be refastened, rather prune it back to where the plant is still firmly attached to the growing surface and the young vegetative growth will replace the removed portion of the vine quickly.

The schizophragma flowers are similar to climbing hydrangea. Both have dense white corymbs that form on last year's wood; hydrangea flowers are surrounded by sterile flowers, the schizophragma flowers bloom later and are surrounded by single large sepals.

Culture of schizophragma is quite simple. It does well in moist, well drained soil and seems to enjoy a situation with good light but not direct sunlight. This can be accomplished by growing the plant under the shade of tall trees or on the north sides of buildings. Although it may take a few years for the plant to start climbing, it will climb and the gardener need only be patient. There seem to be few if any insect or disease problems.

Propagation can be accomplished by seeds, cuttings and layers. Seed collected as soon as ripe, sown and placed in a coldframe should give germination the following spring. Cuttings are quite simple if taken from vegetative wood only and before flowering. If the cuttings are placed in a sweatbox or closed coldframe, they should be rooted by fall. Layering should also be done with vegetative growth and as early in the season as possible.

To the imaginative gardener this plant is well worth seeking and using to create a distinctive garden, not because it is a rare plant, but because it is beautiful.

There is a well-grown specimen at Skylands Gardens, in Ringwood, New Jersey. The plant can be found at the entrance of the Skylands House; *Hydrangea petiolaris* flanks the left side of the doorway, schizophragma is on the right and provides an easy comparison.

Thomas Buchter

Thomas Buchter is the associate director of the Henry Foundation and an active member of the American Rock Garden Society.



sansevieria



close-up — *sansevieria* , flowering



Schizophragma hydrangeoides

photos supplied by authors

digging for information



How To Prepare For Success In The Summer Of '77

by Ed Lindemann

For the gardener March stirs anticipation and enthusiasm to get started with the growing season that lies ahead. We are inclined to lunge ahead with projects that most appeal to us, for example, ordering new plants and starting seeds. We should remember, though, that all of our energies should not be directed entirely towards what is to come, but rather divided so that we are also concerned with what has happened.

Walk around the garden carefully noting what has happened during the winter. Check for damaged and diseased wood and prune it out. Remove the oldest trunks or canes from mature flowering shrubs to allow the newer more vigorous ones to develop. Now is also the time to check fruit trees and to remove weak diseased branches, as well as those crossing or growing back towards the center of the tree. When you are pruning trees and shrubs be sure to check the branches for signs of scale, borers or other insect infestations. Insect controls calling for the application of a dormant oil spray should be applied at this time before the buds start to swell. (Obtain current spray schedules from your county agricultural agent or the USDA.)

Winter mulches such as straw or leaves should be carefully removed from beds. Examine the emerging crowns of perennial clumps for disease or insect damage and carefully replant those that have heaved because of frost. Check the canes of rose bushes as the winter mulch is removed and prune out those that are weak, dead or diseased.

In addition to removing mulches from planting beds be sure to remove fallen leaves and debris that have accumulated and become entwined in the branches and bases of deciduous and evergreen shrubs and hedges. Removing these leaves each season prevents a build-up that eventually blocks light and air circulation and leads to disease and insect infestation.

Once you've cleaned up the garden it is time to think about spring plantings. April 1st is a good date to remember to start tomatoes, peppers and eggplant from seed. You will have six weeks of growing time before setting the plants outside. Do not set the plants out until the weather and soil are warm. Young plants that are set out before mid-May will usually stand still producing little or no growth and may be hit by a late frost. If you plan to start vegetables from seed indoors check them regularly as you would any other house plant. It is important to provide an even degree of moisture, humidity and temperature along with sufficient light. Given the correct environment vegetables will germinate and mature into healthy seedlings in the average home. The biggest problem that people seem to have growing vegetables from seed comes with transplanting. Do not let the newly germinated seedlings stay in the seed flat too long. If the plants are left to grow for six or eight weeks in the seed flat, the roots will be entangled and badly disturbed causing the plants to suffer severe shock when separated. Transplant after the second set of true leaves has appeared. Tomatoes, peppers and eggplants are usually ready to transplant after two to three weeks. Gently remove the seedlings from the seed flat and transplant into 3-in. or 4-in. pots. When the time comes to place the plants outside remove the root ball in one piece from the pot and plant. If you use peat pots as growing containers be sure to peel the pot from the root ball before planting.

March and April is also the time to start many annuals for summer bedding plants. The same rules for transplanting and providing the proper cultural conditions apply to annuals as to vegetables when grown from seed indoors. Above all do not set the plants outside before mid-May. The PHS library has excellent references on growing annuals and vegetables from seed. My favorite is *The Complete Book of Growing Plants From Seed,* by Elda Haring.

When spring comes to the outdoor garden it also affects our indoor plants. The day length increases and house plants respond by producing new and vigorous growth. I start to feed my house plants in March. As the daylight hours increase plants are able to use the nourishment in fertilizers. If necessary, prune, groom and repot house plants in April before they go outside. Since plants are entering their most active growing period, now is the time to take cuttings or to try some airlayering. Vegetative propagation will be more successful now than later in the summer or fall. The same rule applies to setting out house plants as with annual and vegetable seedlings, mid-May is time enough.

Early spring is a time of enthusiasm and work for the conscientious gardener; with forethought, careful observation and preventive maintenance the success of your garden will be greatly improved. Timing is important, waiting too long or jumping the gun can lead to frustration and disappointment. Prepare a schedule, stick to it and enjoy the success of your labor.

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The Greater Philadelphia Orchid Society meets at 8:30 p.m. every 3rd Thursday at Merion Friends Activity Building, 615 Montgomery Avenue, Merion. Visitors welcome. For information call 647-4939.

THE FERN GUIDE, Northeastern United States, Dr. Edgar T. Wherry, reprinted, paperback, 318 pages. Illustrated; detailed, culture of species featured. $3.00 postpaid. Quantity discount to dealers. Morris Arboretum, 9414 Meadowbrook Ave., Philadelphia, PA 19118.

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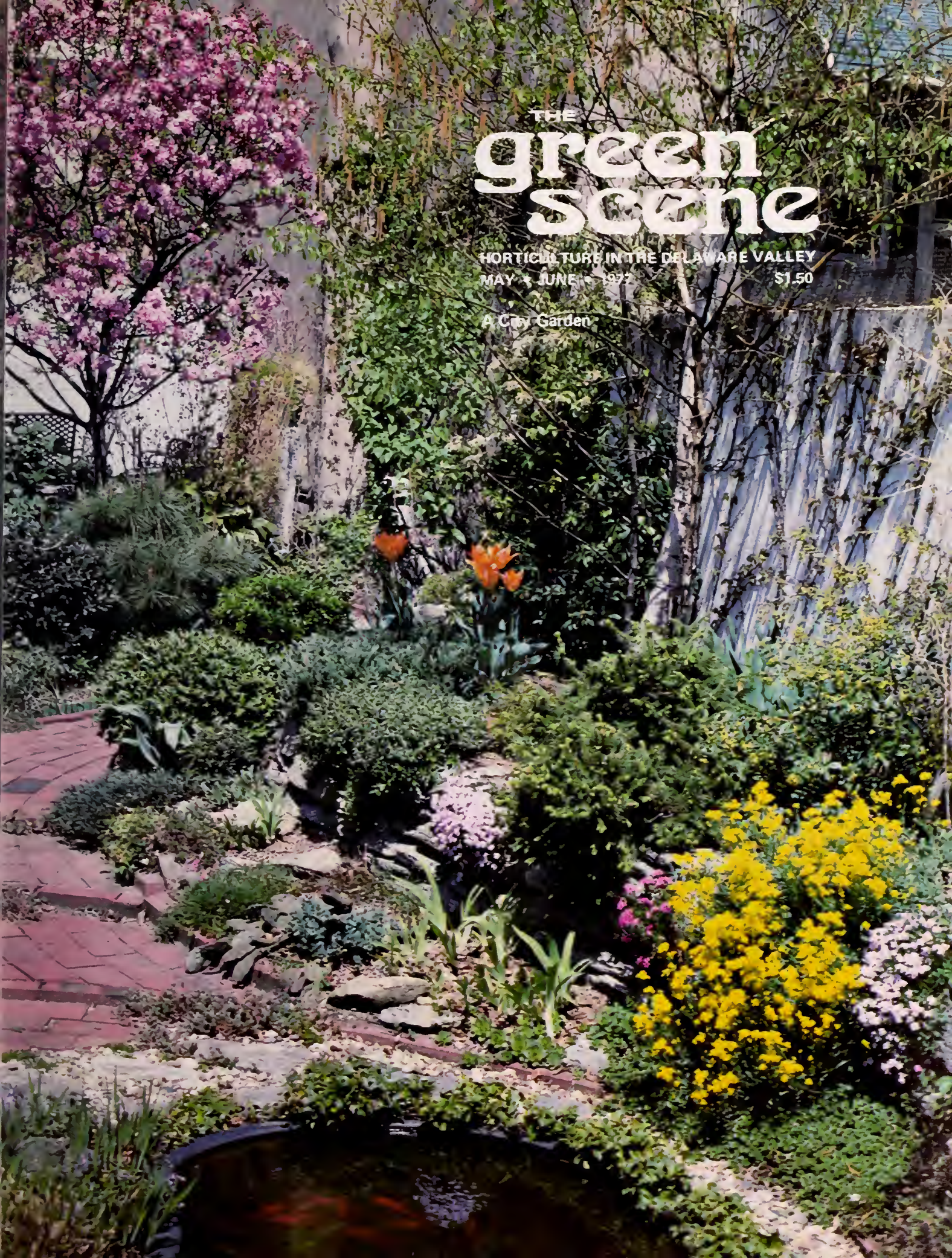
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Spring snowflake *(Leucojum vernum)* heralds spring along the March Walk at Winterthur.



THE green scene

HORTICULTURE IN THE DELAWARE VALLEY

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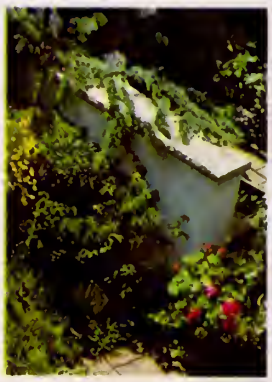
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THE green scene

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Front & Back Covers: City garden of Ann McPhail. See story on page 3. Photos by author

A City Enclave

THREE LOTS IS NOT A LOT



photos and art by author

Watergarden surrounded by pots of geraniums, lavender lantana, yellow coreopis, astilbe and lythrum.

by Ann McPhail

It is not in Society Hill; it is a tiny enclave in center city near the Parkway surrounded by large public and commercial buildings and a growing number of parking lots. The area, needless to say, is subject to change. Since my garden faces one of these parking lots, the planning that went into the design anticipates the day when the lot is developed. The layout of the garden emphasizes privacy and reduces noise so that the sitting areas of the garden can be used in relative comfort during the warm months. There is always an undercurrent of traffic noise in the inner-city, and the pocket-park, located just a short distance from our house, is populated by groups of children. In the garden the trees, shrubs, espaliers, vines and ivies act as baffles to reduce the impact of these sounds.

continued

A City Enclave continued

Ann McPhail attended Barnes Foundation Arboretum courses. She has been closely associated with the 18th century gardens at PHS for the past 10 years. During a four-year period she was in charge of designing and maintaining them and continues to work with the PHS horticulturist in these areas.





We were fortunate enough to acquire a large property encompassing three house lots. It gave us space for a series of connecting gardens as well as cold-frames, a compost pile and a pavilion that contains an enclosure for potting and tool storage. The area also offers two very private places to sit: one is a combination sitting and dining area in the pavilion and the other is at the opposite end of the garden behind a planting of ornamental trees and shrubs.

Gardening in a large city is quite a challenge. I moved back into Philadelphia 15 years ago fresh from the Barnes Foundation Arboretum courses. During this time my husband and I have moved to three locations within the city affording me the opportunity to establish three different gardens varying in size and exposure. In addition, during the last 10 years I have been gaining valuable experience working in the reconstructed 18th century gardens at the Horticultural Society. After much trial and error I found that I had to adjust many horticultural procedures to accommodate to the environment in center city. One becomes aware of the air currents caused by tall buildings; air pollution; insect infestation, particularly the widespread city problem of many types of scale; in walled areas, the concentration of heat and the linger-



A bird's-eye view of the herb garden with its many varieties of thyme blooming around the stepping stones and along the edges of the bricks.

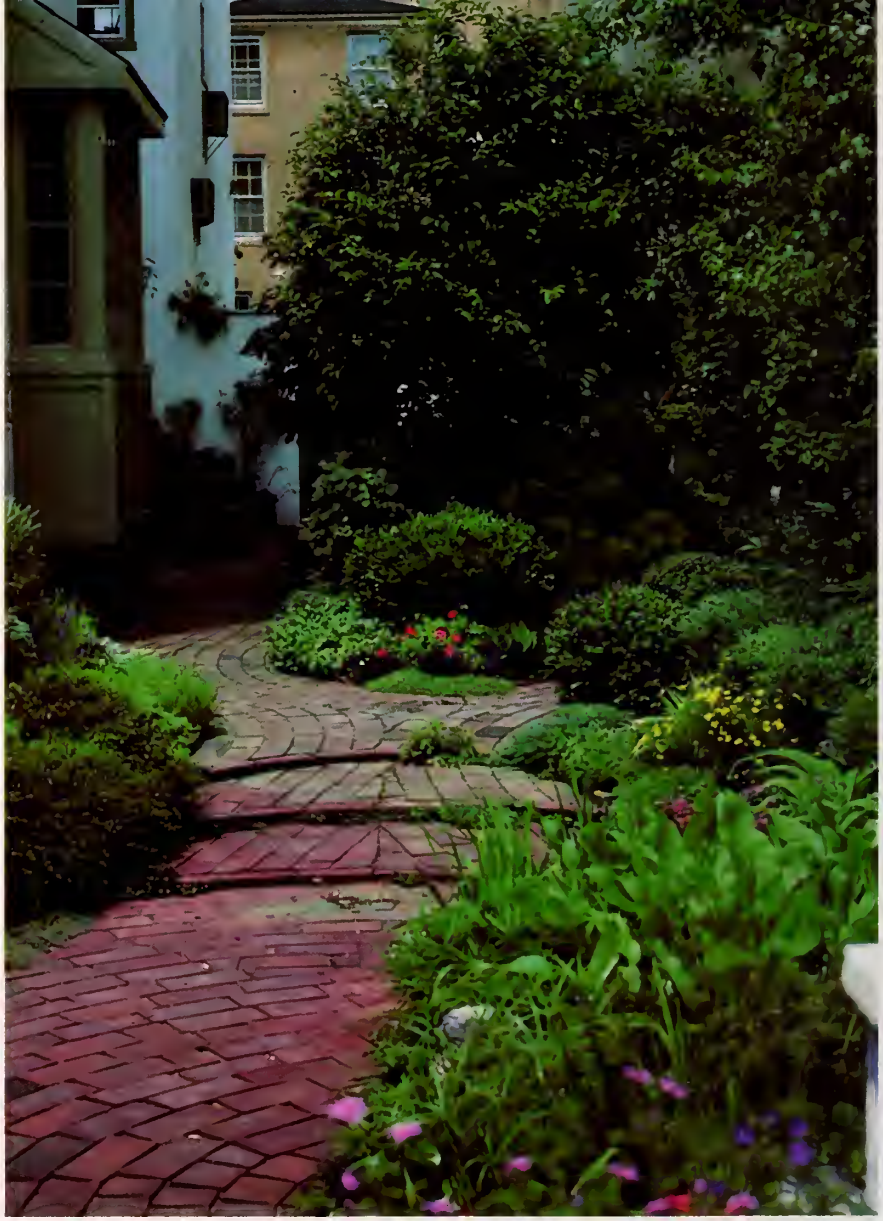
ing problems of dampness during prolonged wet periods; shadows cast from buildings and walls and the use of reflected light off light colored walls as an adjunct to plant growth.

growing everything

The ecology of the garden is complex because I insist on trying to grow everything, and by the middle of the summer there is hardly an inch of space. This means that watering, fertilizing and treatment for pest problems has to be carried out carefully and often. From March to November watering goes on; during the summer on hot bright days the trees and shrubs tend to wilt and a misting is beneficial and washes off accumulated pollution and mild insect problems from the leaves. I try to use insect sprays as sparingly as possible. A light oil spray is used on certain plants in the early spring and a thorough general spraying is done approximately twice during the growing season. For stubborn forms of infestations such as leaf minor, a systemic is applied. One also has to deal periodically with slugs and sowbugs, those two little creatures that commonly inhabit walled gardens. They multiply so easily and are completely indiscriminate in their choice of plant material. In the late fall some of the plants are fertilized and in the spring all receive an appropriate fertilizer. At intervals during the summer I apply liquid fertilizers. In trying to control such a concentration of material, you prune often and it's a lot like painting a bridge: you start at one end and when you reach the other end it is time to start over again. My garden is hardly a low maintenance type; of course, it was not intended as such.

Construction for the walkways and plantings was started in 1971 and continued gradually over the next five years. Before anything could be accomplished new masonary walls were erected around the perimeter of the lot. The workmen uncovered an abundance

continued



A view toward the secluded patio beside the house with the dense plantings of trees and shrubs.



A cluster of primroses.

of beautiful grey fieldstone when the footings for the walls were put in. This type of stone was used during earlier times in the construction of the foundation walls in this part of the city. These stones precipitated and played a role in many of the design decisions I made later, such as the serpentine stone wall that curves around the fish pool and various edgings and additions to pebbled walk areas. A truckload of soil was needed to fill behind the serpentine wall and various other excavations for the planting beds. We had to excavate in the planting areas since just below the surface we encountered old lime and brick rubble from the demolished properties. Fortunately, when the lots were used as a parking area by former occupants, they were not paved over; only a load of cinders was used to level the ground. Where it was convenient we later incorporated the cinders as part of the base for the brick walkways. By

excavating in one area we were able to build up other sections thus enabling us to have a change of levels in the walkways, adding interest, and on the practical side, helping to confine and direct some of the rainwater runoff.

japanese feeling

The herb garden next to the kitchen was planted first while the soil in the stone wall planter was allowed to settle. The herb garden has a distinct Japanese feeling as stepping stones are set with pebbles and larger smooth rounded stones collected from the rivers of Maine. A cast-iron lantern adds form. To simulate traditional moss (which does not survive in the Philadelphia summer sun) around the stepping stones, varieties of mat-like thymes were used such as mother-of-thyme *(Thymus serpyllum)* and woolly thyme *(T. serpyllum lanuginosus)*. The garden is backed by a planter of bamboo and espaliered hardy orange *(Poncirus trifoliata)*. Bamboo is a beautiful, graceful plant but it has to be confined, especially when used in close association with other plants. It has a secret, devious and rampant growth habit with its underground rhizomes. I find the soft greys and blue greens of an herb garden especially attractive and trimming the plants is always pleasant because they smell so marvelous. In the fall I cut and dry the herbs for seasonings and for vinegars.

To the rear of the herb garden is the pavilion built into a corner of the property to give a sense of belonging and also affording the maximum use of precious space. When dining or just sitting here one gets a panoramic view of the garden without intrusion of the city (when we wish a dramatic view of the city we climb to the third floor roof-deck—here over the tops of a collection of cactus and succulents rises the cityscape). Beside the pavilion is a holly *(Ilex aquifolium* var.*)*, grown from seed 16 years ago, that has moved with us each time and now is blooming and bearing fruit. Hollies do well in the city and are easily pruned. The holly is underplanted with ferns and bulbs and nearby is a small collection of Japanese maple *(Acer palmatum* var. and *A. dissectum)*. Toward the rear of the garden are two low walls, staggered and projecting out into the walkway. These disguise a set of coldframes and a compost pile. The latter is so important in the city because it is difficult to obtain and expensive, and a garden built over old foundations (even after many years) settles and sinks. And with all the watering I have to do, the soil does get depleted so the screened compost is dug in often around the plants and trees.

The amount of plant material in the rest of the garden is too numerous to list here but I will attempt to select examples from each area. On the lower end of the serpentine wall next to the coldframes we planted an Atlas cedar *(Cedrus atlantica* 'Glauca'*)* trained to grow horizontally. How else could the garden accommodate a tree with the growth potential of 120 ft. Growing along the wall are espaliered evergreen, euonymous, cotoneaster *(C. salisifolius)*, clump birch, varieties of pieris with underplantings along the top of the stone wall of prostrate junipers, perennials and rock plants such as arabis and geranium *(G. sanguineum)*. The lower level in front of the wall contains a dwarf Hinoki cypress *(Chamaecyparis obtusa* 'Gracilis'), heathers, Japanese roof iris, armeria, iberis, dwarf holly, pyracantha ('Red Elf') and miniature ivies for edgings. In the curve of the wall two small plastic pools were installed. The larger one is deep enough to winter over gold fish. The adjacent smaller pool holds reeds and swamp iris. Plantings of dwarf bamboo, iris, and ivies soften the edges of the pools. In the summer a circulating pump placed under some flat rocks creates a tiny waterfall. There is a pebbled walk area partially surrounding the pools for drainage since this is the lowest point in the garden with shallow steps leading out at both ends of the area. Along the side of the house is the largest planting bed in the garden. It is designed as a free form island surrounded by brick and pebbled walkways. The plantings include French holly *(Ilex ciliata major)*, snowball viburnum *(V. carlcephalum)*, flowering crab apple *(Malus* 'Dorothea'*)*, rhododendron 'Scintillation' and 'Beaufort,' white and pink dogwood and azalea. To the rear of this planting is a secluded patio with a large planter in the center containing a weeping cherry. In the summer most of the house plants are brought out and arranged here in groupings. Pots of geranium and lantana are placed throughout the garden and a few flats of lobelia and bedding begonia are planted around areas that contained spring flowering bulbs. In the fall pots of chrysanthemum replace the geraniums.

As winter approaches, the house plants are pruned and sprayed and, depending on their size, are placed in a plant room off the roof deck or under a series of light units in the basement. Cuttings of herbs and geraniums have already been started in the coldframes and they are potted up and put under the lights. During the winter we watch the change in color in the evergreens and enjoy the red of the holly berries against the snow. As I have indicated, the garden contains a lot of plant material that gives color, texture and form and, most important, pleasure all four seasons of the year. All gardens should be considered year-round but a city garden more so since it is constantly on view.

●

MY ORCHARD

In which an orchard operates under benign neglect

I didn't anticipate the degree of neglect that would come over my orchard when I started it in 1940. It is interesting to reflect on the successes and failures in this laissez-faire orchard, and consider what suggestions can be given to an over-enthusiastic young grower in a suburban hinterland who probably won't take care of his orchard because he is too busy, too lazy, or too fearful of pesticides.

A perfectly ripe peach is my favorite fruit, and I had to have a collection of the finest peach varieties. Unfortunately peaches are more sensitive to neglect than most fruits. They resent growing in sod, and finally succumb to borers, with considerable brown rot and curculio on the way. The last peaches to give up were some adventitious seedlings which bore fine, red-fleshed fruit. Pests have a habit of sneaking in gradually. Success appears assured at first, and then the crop deteriorates to the point where one wonders where those good years went.

Apple trees don't fare well either in a neglected orchard. They suffer from worms, fungi, and fire blight. They have the plant analog of manic-depressive psychosis, or great ups and downs in fruit-bearing activity. We had several lean years and then in 1976 there was a monumental crop on most trees.

The lawn is hardly the place for apple trees. We have only five of our large-fruit apple trees in what we call lawn, but I hate to think of the wheelbarrow loads of apples we raked up and hauled away for mulch from those trees last year. Even the 'Dolga' crab, which is beautiful in flower and also in fruit, presents a considerable problem as a lawn tree. Nevertheless, I think apple trees are worth neglecting. I'd plant an orchard of apples again if only for the flowers and the rot holes that provide nesting places for birds and flying squirrels. Old apple trees also give fine wood for the fireplace or the grill.

We learned to live with half apples—the half without worms. In the great apple years, plenty of whole apples were used. (There were not enough worms to go around those years.) With an abundance, we froze a lot of applesauce and mincemeat for the lean years. One year a charity group came in with a pickup truck and shoveled up apples, worms, rot, leaves, and slugs to feed the old Elam cider mill. They sold the cider for $125, and I was told it had a fine rich flavor (I'm sure without any trace of pesticide).

If you have the space, and fear the orchard may be neglected, plant a lot of apple trees and different kinds. We

Nevertheless, I think apple trees are worth neglecting.

are fond of the 'Anoka' apple because it stands neglect pretty well, bears as a young tree, and bears early in the season when we are glad to get any apples. Many of the best apple varieties do not succeed in our soil and climate. The 'Delicious' is without flavor here and is worthless. 'Grimes Golden,' 'Stayman,' and 'Macoun' have given us fine fruit. The 'Rome Beauty' has borne lots of almost unblemished fruit in good years.

Most of the fine pear varieties fail here because of fire blight. An outstanding exception is the 'Seckel' variety, which is a superb pear. It was discovered by Dutch Jacobs a little south of Philadelphia about 1800, and its origin is a mystery. 'Seckel' and 'Gorham' trees bore pretty well at our place for a number of years. In 1976 fungi caught up with them and the result was disastrous. I'm not sure how many of the pear trees will survive. One or two fungicide sprays could probably have saved the trees and much of the fruit.

Superior clones of the American persimmon have been named and offered for sale by some mail order nurseries. I planted those I could find, and out of 15 trees, there are only two or three that I would recommend. The 'Early Golden' ripens considerable fruit before frost. Many formulas for persimmon pudding and persimmon cake have been recommended in older cook books, but few people are interested now, and it is generally a fruit for casual munching by those who happen to like it. The trees can be completely neglected without suffering and they bear lots of fruit year after year.

I have already extolled the oriental persimmon.[1] Any dedicated gardener should have a few of these trees. It is unfortunate that such fine fruit, grown in tremendous quantities in other lands, is generally unappreciated here. The mature oriental persimmon trees I am growing appear tolerant of eastern Pennsylvania conditions, bear fine dessert fruit in large quantities, and have not so far needed any protection from pests.

Mulberries do not seem to prosper here. The only one that I thought bore fruit worth having was the Persian mulberry, which is not very hardy. The



An Oriental persimmon tree *(Diospyros kaki)* on the author's property. This picture was taken in the fall of 1976. The tree was so laden with fruit that the top of the tree broke off. Note stub in the center.

by M. M. Brubaker

trees yield fine fruit similar to a blackberry but larger. Two trees grew to about 6 in. (15 cm.) in diameter but finally gave up in one of our winters. This Persian mulberry is a 22-ploid and is said to have more chromosomes than any other plant (308). (Most plants are diploids and have two sets of chromosomes. A few are triploids or tetraploids where the chromosomes are tripled or quadrupled. In the Persian mulberry the chromosomes are increased twenty-two-fold.)

Flocks of birds go after all cherries in my orchard as soon as they show some color. Sour cherries have a little better chance than the sweet ones, and in some years we have had enough sour cherries for a pie or two. Plums are harassed by the same types of worms and rots as the peaches. The 'Stanley Prune' is the only plum left in our orchard. It bears fine fruit and occasionally we get a big enough crop to outnumber some of the pests. That's a joy worth looking forward to.

The northern custard apple has already been described in a previous issue of the *Green Scene* (May/June 1976). These trees require a minimum of attention, but unfortunately the large, sweet fruit has about as many maligners as defenders. Quite a number of small fruited trees have been grown, but none has stirred up much excitement in our culinary department. Most of them like the elaeagnus and amelanchier have succeeded very well without attention.



photos by author

Hazelnut blossoms

We learned to live with half apples —the half without worms.

In fact the elaeagnus has succeeded so well that seedlings can be found sprouting up almost anyplace on our 50 acres.

Nut trees have generally been a disappointment under conditions of neglect. The 'Broadview' Carpathian walnut was self-fertile and bore fine nuts for a few years. Then the pests moved in including the squirrels. The most productive of the nut trees has been the Chinese chestnuts. However, most of the chestnuts from neglected trees contain an egg of the chesnut weevil. If the nuts are picked up immediately and roasted, you may not know the difference. If the nuts are left on the kitchen shelf for awhile, the worms hatch, eat, grow, and crawl out around the kitchen looking for some compost to pupate in. Most of the nuts will have a hole in the shell where the worms ate their way out. Nevertheless the chesnut is a beautiful tree and should be planted, along with the hickories and black walnuts, for posterity.



Birds and flying squirrels nest in this apple tree.

In contrast to all my pessimistic comments about fruiting in the neglected orchard, I must say that the yield of flowers has been glorious. These trees have been an inexhaustible source of material for flower arrangers and bouquet builders throughout each winter and spring. Some of the poorest fruit trees have given the finest flowers from forced branches. One pear bought as a 'Duchess' variety gave miserable fruit. (I think the nursery graft failed and I was sold the sand pear root stock.) So many branches have been cut from this tree for forcing that only a skeleton is left. Some of the plums were only used for forced branches. Apricots are worth planting just for that beautiful pink and green color combination in the early spring buds. Birds get all the amelanchier fruit, but the trees put on a wonderful show of flowers in the spring. Each year the late winter opening of hazelnut flowers on forced branches in our hall forecasts spring almost as loudly as the skunk cabbage arrangement on the dining room table.

So my advice is to plant your orchard (judiciously) and live it up, even though you'll never be able to give it those 10 or 15 pesticide sprays every year.

●

[1] *Horticulture,* Sept. 1972.

M. M. Brubaker is a frequent contributor to the *Green Scene.*

PYRAMIDING YOUR GARDEN

"Dad, can I order some strawberry plants?"

The plants came and so did the berries, but then the weeds took over.

The young man's enthusiasm waned. What do you do when you have a weed-infested strawberry bed?

Well, I had heard about strawberry pyramids and I thought I would give them a try. I made a series of three circles out of 4-in. high heavy duty aluminum lawn edging, joined with a pop rivet gun. One circle was 12 in., one was 24 in. and one was 36 in. in diameter. The largest circle is placed on the ground first, then filled with soil. The next largest is placed on top of that, filled with soil, and the process is repeated until you are finished.

I was somewhat surprised at the amount of soil needed to fill the pyramid. It is a simple mathematical formula but it is one of those things you don't figure mathematically; you just keep taking soil from one place or another to fill it up.

We finally got the pyramids built and the plants in it by April. The plants were prolific, producing fruit in both May and June, and we found that we had other fringe benefits. With the plants in the pyramids, practically all weeding was eliminated and any weeding we did was so easy that it was a pleasure, not a chore. Wood chips on the ground between the pyramids prevented weeds from growing there.

The pyramids seemed to be the solution to the strawberry problem. I always believed the new plants were the producers, so each year I would clean out one-third of the entire bed so that no plant would be more than three years old.

Before we knew it, another spring had rolled around. It was St. Patrick's Day and the onion sets and peas must go in. The ground was in no condition to cultivate so we did what came naturally. We took a pyramid and planted peas and onions, and stood back and watched things pop.

Would it work? WOW. Our onion crop was tops (I mean big bottoms), and while the peas weren't as prolific, they were the best crop of snow peas we ever had.

Now it was time to get serious about the pyramids. How far apart should each layer be? Because the aluminum edging was 4 in. high we did not give that much thought, but each circle could be different.

We tried the top with an 8 in. diameter, next a 16 in. diameter, then a 24 in. diameter, 32 in., 40 in. and the bottom layer was a 48 in. diameter, six tiers high and 4 in. for each step. They sure took a lot of soil. We piled all sorts of stuff in the middle, added lime, peat, moss, sand, compost and then went out to buy top soil. Each new layer was a new challenge for more soil and filler.

It is one of the things you start and it just sort of makes you want to finish it.

Well, if those steps were 4 in., that would be fine for lettuce, radishes, carrots, beets, but we thought while we were doing it, why not try a 6 in. space all the way around? Top circle we made 12 in. diameter, then 24 in., 36 in., 48 in. and 60 in., this one was five tiers high and what a job to find the soil.

Well, we had a 4 in. and a 6 in. step, why not an 8 in. step? We stayed with a 12 in. top, next was 28 in., then 44 in. and 60 in., only four tiers high. I am not quite sure where the soil came from for this last pyramid. Sod, a trip to the woods, more peat, sand, and anything to get it full. It seems like an insatiable monster. Each layer was smaller, else I would have given up.

If you add up the running space that we had (a 48 in., six tier circle provides more than 40 running feet of planting area), we had room for everything. Someday after I figure out how much growing medium is needed to fill a pyramid, I will measure them so that I will also know how many feet we have available for planting.

Now, not everything is meant to be planted in pyramids, but some things do better there than any other place. Also because the plants are concentrated in a small area, when you fertilize, it seems as though you use every drop.

The top ring is a natural for parsley, chives and a variety of lettuce. Radishes, which grow quickly anyplace, literally pop out of the ground, and carrots just grow and grow.

Remember how I mentioned putting soil into one ring or another? Well, we had carrots that grew down the four inches, then you could see the root change when it hit the next plateau. And beets, they grow so big and they were oh so tender, oh so tender, even though they were big, and I mean big.

Everything we ever grew, grew better in the pyramids. One thing that I never would have thought to try was cauliflower. My wife did not ask, however; she just went ahead and planted and grew the nicest cauliflower we ever had (which is in the refrigerator pickled along with our carrots, peppers, cucumbers and onions).

In all, we had great success with parsley, radishes, lettuce, beets, carrots, kohlrabi, peas, onions and, of course, strawberries.

I have had people tell me that I get no more room by my pyramid method; that things must be watered, and I know the ground does sink in certain places so you have to add soil, but to me pyramids are "in" and if you stop by in season, I will be happy to slice and share a kohlrabi with you.

●



by Eli C. Schmidt, Jr.

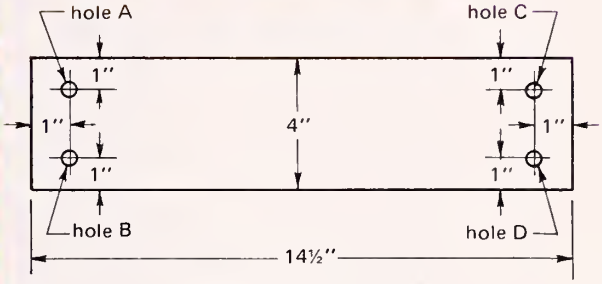
Eli C. Schmidt, known as Schmidty, ran the Hill Hardware Co. in Chestnut Hill for 27 years. He now runs the Hill Co., a store specializing in quality garden furniture.



photos supplied by author



The carrots grew down the four inches and you could see the root change when it hit the next plateau.



Constructing Pyramid Ring

11

Use heavy-duty aluminum lawn edging or plastic lawn edging.

This size will make a 4" diameter ring.

Drill holes A, B, C & D.

Place hole A over hole C and fasten with nut and bolt or rivet. Then bolt or rivet holes B and D.

Aluminum or plastic edging allowing for a 2" overlap:

4"	diameter	needs	14½"	edging
6"	"	"	21"	"
8"	"	"	27"	"
12"	"	"	40"	"
16"	"	"	52"	"
20"	"	"	65"	"
24"	"	"	78"	"
36"	"	"	115"	"
48"	"	"	154"	"
60"	"	"	191"	"

Cut edging—overlap 2"—join by rivets or nuts and bolts.

al Border * Perennial Interest in



by Mary & Wilbur Zimmerman

Mary and Wilbur Zimmerman started gardening together in the mid-1930's with a vegetable garden, 400 hybrid tea roses and a large perennial border. Eventually they added four greenhouses, which housed some 6000 orchids. As their interest in orchids increased, the Zimmermans abandoned the roses and they removed the perennial bed. After about 30 years, they moved to an apartment; two years later apartment living palled. They bought a new house that required complete replanting outside. They are now both very happy to be back planting, digging, weeding, transplanting, pruning and spraying.

L. Wilbur Zimmerman is chairman of the PHS Council.

It is a fairly complex matter to design, plant and maintain a proper perennial border. You cannot look upon it as a low maintenance gardening enterprise. On the other hand, the challenge and interest derived from such a border makes the effort a very satisfying one.

In the Delaware Valley area, blooms can be enjoyed from March until November in a well-planned border. The quantity of bulbs and herbaceous plants available provides a tremendous range of size, color, form, texture and period of bloom.

For best results, a border should be deep from front to back. In some cases its outline will be dictated by an existing architectural feature, which will determine its shape. A curving front line seems to provide greater interest and variation. Line and mass are still the first aesthetic consideration; color is secondary.

Select a site that allows for good drainage. Another important adjunct is either a background fence, a wall or hedge anywhere from 4 ft. to 8 ft. high. An evergreen hedge is probably the most desirable of all. It provides a visual background, breaks the force of high wind yet permits some degree of air movement.

The site and the outlines having been decided upon, the next step is careful and proper soil preparation. If as in most cases, when a new bed is prepared, there is sod, it should be stripped off first and used to patch bare spots somewhere else or stacked to augment the compost pile.

With the bare soil exposed spade thoroughly, preferably by double digging.* In our own case we added a mix to the spaded soil that raised the finished level an inch or two higher than the original grade. The mix consisted of wood chips that had rotted for more than 10 years mixed with peat moss, vermiculite, gypsum and lime. The proportions work out to be about five wheelbarrow loads of the rotted chips, two wheelbarrow loads of peat moss, two loads of vermiculite, two bags of gypsum and two bags of lime. The blend was well forked before it was mixed into the soil.

All this work was done in late August and September to prepare a border 175 ft. long that varied in its depth from 6 ft. to 17 ft.

During the summer we gave a landscape architect a list of about 40 shrubs from which to make a selection (see box). The shrubs were to be placed that fall according to size, texture, color and blooming period.

continued

*Double digging. Dig an initial trench 2 ft. in width, 1 ft. deep, across the end of the bed. This soil is moved to the farther end of the bed to be used in filling the final trench. Spread manure [or mixture] in the trench and fork it into the ground as deeply as possible. Dig the next trench 2 ft. wide and 1 ft. deep, turning the soil into the first trench and enriching it with a layer of manure [or mixture] when half the soil has been moved in. Break up and enrich the bottom of the second trench and continue across the bed in this manner. From *America's Garden Book,* James & Louise Bush-Brown. Charles Scribner's Sons, NY 1958.

photos by author



Spring, muscari and tulips



Spring, *Phlox divaricata,* tulips, pansies, kerria and spirea.



Midsummer, showing *Dicentra eximea* in foreground.

a Perennial Border * Perennial

Perennial Interest continued



Early summer

Shrubs Selected for Perennial Border

Abeliophyllum distichum
Camellia japonica, unnamed hybrid
Caryopteris 'Heavenly Blue'
Chaenomeles japonica cameo
Chimonanthus praecox
Currant 'Red Lake'
Gooseberry 'Pickwell'
Exbury Hybrid azalea
Forsythia x *intermedia* 'Lynwood Gold'
Fothergilla major
Hibiscus syriacus 'Alba'
Hydrangea quercifolia
Kalmia latifolia
Kerria japonica
Philadelphus sp.
Pieris japonica
Pink azalea
Rhododendron calendulaceum
Rhododendron mucronulatum
Rhododendron racemosum
Rhododendron schlippenbachi
Salix gracilistyla
Spiraea x *bumalda* 'Anthony Waterer'
Spiraea x *vanhouttei*
Syringa, French hybrids
Tree peonies
Virburnum rhytidophyllum

Some of the material was selected for partial shade. One end of the border is in partial to almost complete shade; the two mature apple trees within the border add another shaded area.

During the first fall we planted the shrubbery along with 165 lilies, eight or ten clumps of a dozen each of tulips and a like number of clumps of daffodils.

the perennials

We spent the early winter choosing perennial plants to be placed in and around the shrubs and bulbs. The planning was to take into account the fact

that the shrubs are eventually going to take up more space than they do when planted. Not only must future growth be taken into account, but we had to decide how much we were to let the shrubs expand, and plan to prune vigorously thereafter. Initially minor spot pruning is done as needed, almost weekly during the growing season, and a rather general major pruning done at least three times during the growing season.

Plants Selected for the Border

Achillea sp. - yarrow
Allium giganteum - ornamental onion
Anchusa myostidiflora - forget-me-not
Asarum sp. - wild ginger
Asclepias tuberosa - butterfly weed
Astilbe biternata - goat's beard (four colors)
Aquilegia sp. - columbine
Campanula latifolia - bellflower
Centaurea cyanus - bachelor's button
Chrysanthemum x *superbum* - shasta daisy
Cimicifuga racemosa - black snakeroot
Delphinium sp. - larkspur
Dianthus sp. - pink
Dicentra eximia - turkey corn
Digitalis sp. - foxglove
Fritillaria imperialis - crown imperial
Gypsophila paniculata - baby's breath
Heliopsis sp. - oxeye
Heuchera sp. - alumroot
Hosta sp., several varieties
Iberis sp. - white perennial candytuft
Lobelia cardinalis
Lobelia siphilitica
Matteuccia sp. - ostrich fern
Monarda sp. - wild bergamot
Muscari sp. - grape hyacinth
Phlox divaricata - sweet william
Phlox, summer hybrids, white and pink
Physostegia sp. - false dragonhead, regular and alba form
Platycodon mariesi - bellflower
Polystichum acrostichoides - Christmas fern
Primula sp.
Rudbeckia sp. - cornflower
Salvia sp. - sage
Scilla sp. - squill
Stokesia sp. - aster
Thalictrum glaucum - meadow rue
Veronica sp. - speedwell

We have four small specially designed coldframes along the back edge of the vegetable garden, and it is here we raise our seedlings: foxglove, delphinium, primula and aquilegia plus others occasionally.

The delphinium raised in this manner, then lined out in a portion of the vegetable garden, seem to produce plants with greater vigor.

The backbone of the design has now been provided by the shrubs and by the positions of the lilies and other bulbs. The lilies are planted with the taller late bloomers further back and the shorter stemmed ones with earlier bloom in front.

Then begins the planting of the perennials themselves. Fortunately, they did not all arrive at once. The master plan was kept nearby and consulted frequently as the plants were set. We placed the larger growing plants from middle to rear and shorter forms in the foreground. We also considered various blooming periods so that the concentration of spring bloom is not all at one end or the midsummer bloom all in the middle. By avoiding generally purplish reds we had little problem with juxtaposing incongruous colors.

Some annual material helps to provide a higher concentration of blooms at certain times. For example, as soon as white pansies are available, usually in April, we group them sporadically along the front of the border; they seem to take the frosts that occur during the next four or five weeks with no great setback. By early to middle June these are replaced by dwarf white petunias, which with a little judicious pinching and care go well into fall.

Hesperis has been spotted in the shade areas and is allowed to seed itself, which it does quite well. If an odd one or so comes up where it is not wanted we either transplant it or simply pull it out. Nicotiana is planted in certain shady spots in July. We use impatiens, too, in places where required.

We treat our chrysanthemums as annuals simply because we do not want them occupying all that space in spring and summer and there is not room enough elsewhere to carry them along until transplanting time in late August and September.

All of this moving and transplanting is relatively easy because the ground is in such good tilth that it is very friable to work in.

We watch watering carefully. If we've been without rain for a week or so we poke around in the bed to see if the ground is dry and we water if necessary. Of course, things that have been transplanted are watered more often for the first week or so. But the soil's need for water must actually be judged by feel not by how long it has been since the last rain.

fertilizing

Fertilizing is done by broadcasting in the early spring as soon as the mulch and winter debris have been cleared away. We use a general purpose fertilizer like 10-10-10 or 10-15-10. Four weeks later in the season, numerous plants are spot fertilized around their base but not on tender young growth. Later in the summer, a third light application may be made with a higher percentage of phosphorous, being careful not to place it around the shrubbery, thus stimulating late season soft growth when the plant should be in its hardening off stage in preparation for dormancy.

In order to make the application of dry fertilizers easier and less critical as to the amounts delivered, we mix in a bucket in the ratio of a trowel full of the fertilizer to three trowels full of gypsum and mix well. By diluting the fertilizer in the white gypsum we can see the concentration more readily as it is broadcast and be sure it is more accurately placed. At the same time continuous applications of gypsum help to maintain a desirable looseness in the soil texture.

There are some special applications like placing lime around the delphinium area early in March.

Spraying seems to be a necessary evil so we prepare ourselves early in the season by seeing to it that the electric atom-mist is in good working order, and that we have a suitable variety of sprays to meet various situations. Kelthane, Systox, Benlate and Phaltane are

continued

Perennial Interest continued

our standbys. We use some others that are similar at times, but that is only because we're experimenters.

We watch the rest of the border carefully and at the first sign of any problem, we spray with a mixture of Systox and one of the fungicides.

Part of the spraying program is to watch the hemlock hedge behind the border for red spider.

The phlox and delphinium are routinely sprayed with the same mixture, which seems almost to eliminate mildew. When we spray the phlox we move down the border and treat the lilacs. The other plants are checked frequently for problems and sprayed only as needed.

We recommend the atom-mist sprayer highly. The force is great and gets through on the under surface of leaves and its fine mist makes for superb coverage of the spray solution. Both of these factors are important if the spraying is to be effective.

Needless to say, it's essential to measure according to the label. Only a little extra strength can burn foliage. Use a measuring graduate that will show ounces, milliliters and teaspoons, because it is most difficult to convert these measurements without a conversion table and sometimes a pencil and paper.

increase and decrease

After the first season of bloom is over the plants will have filled the space pretty thoroughly. In the second season it is necessary to separate a few of the plants and in the third season many more. Dig them up with lots of soil, with the ground moist enough to keep the ball of soil from falling away, separate and keep the best part or portions, freshen the soil in the hole with well-rotted compost peat moss and some gypsum and replant what you wish to plant there. Water well and give away the surplus divisions.

This division of plants is an on-going operation throughout the growing season. We find, too, that in spite of the best planning, we have too much of something in one place and not enough elsewhere Some plants grow a little taller than anticipated and hide others. Consequently, plants must be shifted at times. If a large ball of earth is included, this is no problem.

Then, too, every season we decide that we like some of the plants that we have experimentally placed and want to increase the amount. Since the border is already full, the only way we can do that is to cut back on the quantity of something else.

There are bound to be plants in a group that for some reason or other develop poorly or die. We have two back-up gardens where we keep, for example, spare plants of those that are more prone to winterkill. One garden is a semishaded spot with a standby bed with extra plants of delphinium, foxglove, pyrethrum, and others. The second is a part of the vegetable plot used for the same purpose; it also serves as a cutting bed for some perennials along with the annuals planted there.

One of the things you would notice if you were to see our border is that if we let the shrubbery grow to any greater extent we would have much less room for the other plants. Part of the reason for providing the shrubbery is that we can foresee the day when we might not want to spend as much energy maintaining the perennials. By letting the shrubs expand and letting the ferns, the hosta and a few of the hardiest and long-lived perennials, such as astilbe, along with the lilies spread, we can still have a fairly showy border even if the variety of plants is reduced.

The plants we've used by no means exhaust the possibilities. These are selections based on personal preferences; many, many other varieties are suited.

Several things deserve special mention because of reliability and long blooming periods. Rudbeckia is a hardy perennial that blooms from June into September providing constant bright yellow areas. *Dicentra eximia,* a relatively lower grower, is in flower from May until frost, a dull red on a beautiful fern-like foliage that retains its crisp appearance all the while it is in bloom. Numerous varieties of lilies add great seasonal accents from mid-May to Labor Day.

If intelligence illuminates a subject by bringing together aspects that no one else has yet linked together, then there can be a similar fascination in putting together a perennial border by placing plants in a slightly different way than anyone else has thought to do. We know it can bring you much satisfaction.

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Late August, secondary bloom on delphinium behind marguerites and pink phlox at left rear.



Spikes of *Lobelia cardinalis* in early September. *Dicentra eximia* in foreground.

by Phyllis Simpson



photo by Edmund B. Gilchrist, Jr

cucumbers in a hanging pot? why not?

To those of us who live in apartments or townhouses with postage-stamp-size backyards, the articles about growing your own fresh vegetables in the spring horticultural magazines are frustrating. Early in 1975 I surveyed my tiny yard, most of which is concrete, to see if perhaps I could manage a few vegetables in spite of all its drawbacks.

First of all, the six-foot high wooden fence cuts off the sun from the ground level for part of the day. Then, the trees outside the yard give wonderful shade on hot afternoons to anyone

Phyllis Simpson is a graduate of the horticulture program at the Ambler Campus of Temple University. She teaches classes in house plants in adult education programs.

who might want to sit and relax in a lounge chair, but they cut off the sun from any vegetables that might be growing in the small patches of soil there. Lastly, the soil itself, because of where it is, often remains wet far too long after a rain, and therefore is not good for raising vegetables.

As I watched the sun shining on the top of the fence I thought I might try some hanging pots of annuals to add color to the yard. It was then I realized that hanging pots could very well provide growing space for vegetables instead of petunias. I gave it a try, and it succeeded.

Four hanging pots, 6 in. deep and 12 in. in diameter, were hung on brackets that extended about 7 in. from the fence—enough so that the pots hung clear of the fence. I picked brightly colored pots to give me some of the color I wanted initially. The problem of which soil to fill them with came next. I did not want to use the soil in the small patch of the existing garden, nor did I want to spend money for prepared soil at the garden center. (Why end up having the cucumbers cost $1 each because of all the preliminary purchases!) Behind our row of townhouses is a small woods where autumn leaves have been dumped for years. Shoving aside the top layer from the previous autumn, I found a deep reservoir of wonderfully decayed leaf mold, free for the taking. This was sieved through ½-in. mesh hardware cloth and mixed with coarse sand—about three parts leaf mold to one part sand. A handful of 5-10-10 fertilizer was added to this mixture when it went into each pot.

The first week in May found me as ready as any farmer for spring planting time. I decided on a small early cucumber as I feared that larger ones, which would hang down instead of lie on the ground, might be too heavy for their stems and break off. Four seeds went into each pot, later thinned to two plants per pot.

The next six weeks were spent watching the vines start upward and then run along the top of the fence; watching the first flowers bloom and fade, and finally seeing tiny cucumbers begin to show their shape. The vines clung to the fence without needing to be tied; they did not run far—less than 3 ft.

Because the roots were confined to such a small space with limited water-holding capacity, the plants had to be watered every day unless it rained. During the hot days of July, it was necessary to water more than once a day or the leaves would wilt in the afternoons. Every two weeks, a small handful of fertilizer was added.

From the end of June until the end of August there were fresh cucumbers, delicious and crisp, to be picked minutes before they went into the evening's salad or were eaten just sliced and salted.

Shortly after the first seedlings had started to grow in the hanging pots, my delight in what was happening near the top of the fence inspired me to try container-grown vegetables lower down. Perhaps, if I planted in containers, I reasoned, the higher than ground soil level might put the plants in a position to get sufficient sun.

Back I went to the leaf mold area and to the sand pile to start sieving and mixing again. For containers, I used a plastic trash can that had held bird seed in the winter and that the squirrels had nibbled through, an old plastic waste basket, and two garden containers that had been previously filled with chrysanthemums. Each of these had drainage holes in the bottom, over which I placed several inches of stones and crock; they were set up on bricks to drain off the excess water. I filled them with the leaf-mold and sand mixture, along with the usual handful of fertilizer.

For the ground containers I chose yellow zucchini, green peppers, and small hybrid cantaloupes. These went into the largest container because I thought they would produce the most foliage. Although these containers were larger than the hanging pots, they had to be watered just as frequently since the heat reflected from the concrete on hot days caused wilting.

Fresh peppers were available from August until the first frost at the end of October; the plants, themselves, were a rich, shiny green and a pleasure to observe. The zucchini were large and plentiful, although they were the first to stop producing. The few cantaloupes were tasty, but the vines were too long and too much bother for the few fruits they produced. By the end of August, the containers that had held the cucumbers and zucchini had been cleared out, the soil had been turned over at the top, and a quick fall crop of radishes and lettuce was started.

None of the plants was attacked by any kind of insect or disease that first year.

The container that had held the cantaloupes was filled with chrysanthemums for autumn color.

None of the plants was attacked by any kind of insect or disease that first year except for some white fly late in September. The only possible explanation I can give for this might be that the leaves of container-grown vegetables are not in such close contact with the soil as are the leaves of conventionally grown plants; also, the ventilation around them was better than it would have been around plants on the ground.

The next year, 1976, found me eager to get going. I used the still viable seeds saved from the previous year. In place of cantaloupes I used green zucchini. A few parsley seeds planted around the edge of the green pepper container made attractive edging plants.

The second year, however, brought

continued

difficulties I had not had the first year. I mention them only to show that container growers fall heir to the same problems as anyone else.

As every gardener in this area knows, 1976 was the worst year for Japanese beetles that we have had for a long while. By the end of July, much of the cucumber and zucchini foliage had a raggedy look because of the beetles, although the fruit was not affected. As a possible insect repellant I had planted a garlic bulb in each pot, but that seemed to have no effect on the Japanese beetles or the striped cucumber beetles, which also appeared. Other than a strong spray from the hose when I watered, no repellant was used.

A second crop of cucumbers was planted in one of the hanging pots about August 1. In spite of the fact that there is less sunshine in August's shorter days, fruit was produced in September. The pepper plants again continued until frost.

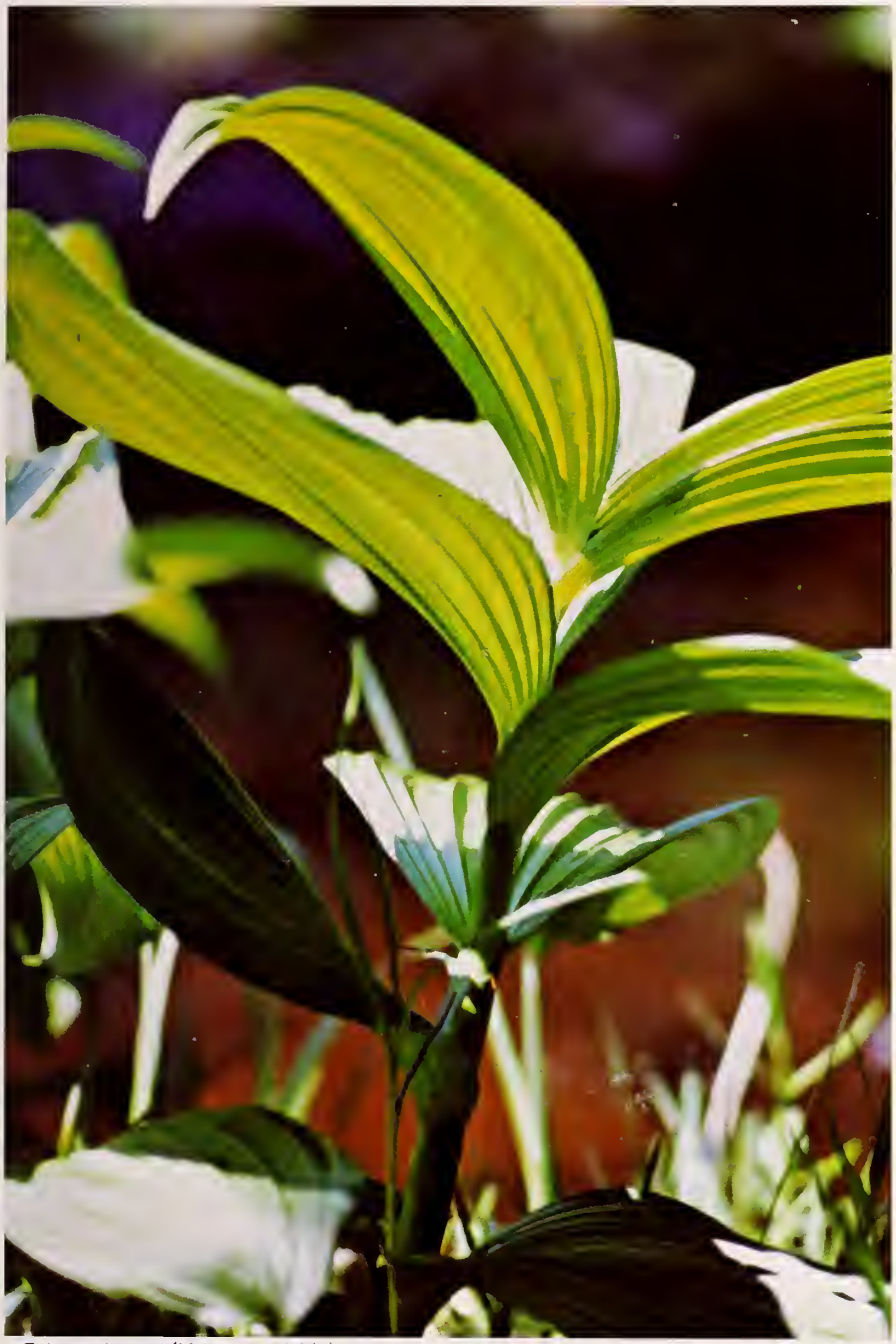
One other unexpected problem, peculiar only to those who live side by side in modern housing, came up the second year. The new neighbors ran their air conditioner almost continuously, making a mini-climate in one corner of my yard that was warmer than the rest. There was, therefore, more watering necessary in that area.

Tomatoes, which are probably the most popular homegrown vegetable, would have done equally as well as the vegetables I selected, but I am not a tomato eater. Anyone who saw the Burpee exhibit at the 1976 Philadelphia Flower Show saw how well tomatoes can be grown in hanging pots. There was also a vegetable garden exhibit on 5th Street at Market Street at Channel 3, for bicentennial visitors this summer, which had hanging pots of tomatoes, luscious and ripe when I saw them in early September.



This summer? Now that I know it can be done, with or without beetles, I am ready. I have spent January and February evenings poring over seed catalogs, picking and choosing new varieties with all the enthusiasm of the gardener who has a full acre of vegetables. I have the advantage of having mine closer to my kitchen door, with far less stooping needed to gather in my crops.

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photos by author

False hellebore *(Veratrum viride)*

Shooting Plants

by Atherton Seeley

Atherton (Ath) Seeley, former advertising executive, became interested in photography after retiring in 1971. Since then he has produced several award winning pictures, has exhibited in several galleries and has had a very successful show of his own.

After the handshakes and the "gold watch" that usually go along with retirement from a job, the big question arises: what to do next. Your colleagues probably suggest you continue in the same type of business but on a reduced scale, or that you become a consultant and carry on.

Well, to some people, perhaps, that is good advice. To others retirement provides the opportunity to do more about the things you have always wanted to do but have been too busy to do much about. So, when my turn came I indulged in a rather expensive 35mm camera with accessories and started out to be a photographer.

At first my camera and I didn't get along too well but gradually, as I got to understand it better, my pictures improved. I got over the urge to shoot everything in sight and became more selective. Wildflowers turned out to be of special interest. Amateur "flowering" and "birding" have provided a lot of pleasure and the camera has become an important part of the many field trips.

continued

Shooting Plants continued



Star-of-bethlehem
(Ornithogalum umbellatum)



Dwarf ginseng *(Panax trifolius)*



Indian pipes *(Monotropa uniflora)*

My interest in these things began when I was a boy and spent the summers with my family in the Poconos. My mother, who had considerable knowledge and appreciation of nature and its wonders, taught us to listen for the magnificent song of the hermit thrush as the sun went down. We shared the pleasures of finding a patch of fringed gentians or locating a new group of cardinal flowers along the banks of the Tobyhanna.

Undoubtedly it was this background that led me into the type of picture taking I now find of special interest. I began by taking "catalog pictures" of each new wildflower, identifying it and adding it to my collection. I got to know and appreciate many new ones. But it wasn't until I found that the camera, when used with imagination and an appreciative eye, could create far more interesting pictures of these same plants and flowers that I began to feel I was accomplishing something worthwhile.

Now, when I take a picture, I usually use a close-up lens and consider the design and the coloring of the part of the subject that I find most interesting as well as the lighting, the camera angle and so on hoping to produce an artistic effect.

Everybody knows what a star-of-bethlehem *(Ornithogalum umbellatum)* looks like. Not everybody recognizes it when they see it as my camera and I see it. The close-up view emphasizes the beauty of the inner flower as well as the sweeping curves of the outside petals of the outer blossom. Distractions in the background have been eliminated and the whole picture enlarged for dramatic effect.

The dwarf ginseng *(Panax trifolius)*,



Spikenard *(Aralia racemosa)*



Longleaf pine *(Pinus palustris)*

a spring flower that grows close to the ground and is about the size of your smallest fingernail, reveals a design through the close-up lens fit for a bridal decoration.

The spikenard *(Aralia racemosa)*, a small plant that grows around the lakes in the Poconos, when observed through the close-ups, has all the excitement of a fireworks display on the 4th of July.

The false hellebore *(Veratrum viride)* is an all green plant that grows 2 to 3 ft. in the swampy ground along mountain streams. It is at its best in June and early July. The long graceful curves of its large leaves as they alternately branch out from the plant stem make a pleasing picture, but given the right shadows and lighting the camera lens produces a much more exciting picture that interior decorators might find interesting for a colorful picture to hang on a wall.

Almost everyone knows what a pine tree looks like but the close-up of the needles of the Austrian pine *(Pinus palustris)* caught our interest as did the Indian pipe *(Monotropa sp.)* that is apt to pop up anywhere in the damp woods.

And so it goes. The first snow is just beginning and soon we will be packing up our gear for Florida, but next spring we will be back in Pennsylvania traveling the old familiar trails searching for more new plant and wildflower pictures. Indian pipe *(Monotropa uniflora)* that is apt to pop up anywhere in the damp woods.

And so it goes. As I write this, the first snow is just beginning and soon we will be packing up our gear for Florida. But in spring we will be back in Pennsylvania traveling the old familiar trails searching for more new plant and wildflower pictures.

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PATIOS:
Creating the Best Kind

by Herbert Bieberfeld

Patios are an important part of landscape design. They provide space for outdoor living, entertaining or relaxation. Also, they serve as a transition from buildings to landscape, or man to nature. Proper design, materials and construction will insure long-term use and enjoyment from the patio.



A church courtyard



A woodland walkway

There are three basic methods for constructing a patio: concrete, brick laid in concrete and dry (patios without mortar). Most houses have concrete or brick-concrete patios. That's unfortunate because dry patios have many advantages over concrete patios. To understand this concept one must compare the three.

Concrete should never be used in residential patios. The basic concept of a patio is destroyed when concrete is used; the overall shape is either a mundane square or a rectangle. These shapes do not lend themselves to the natural contours of patios, gardens or walks. Water cannot penetrate the patio's surface, which causes excess water at the perimeter and a deficiency to any plant life within or below the patio. Essentially, concrete patios add little interest to a home and limit the versatility of design.

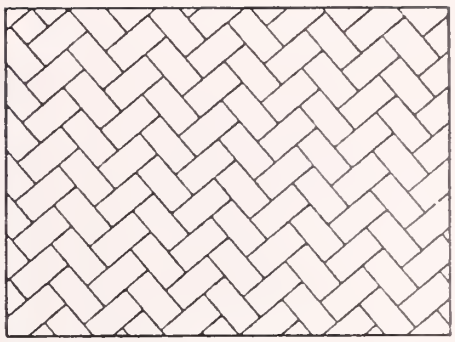
Concrete-brick patios are popular among masons and builders. They are strong enough to hold up under heavy traffic and can have interesting brick patterns. However, they have many disadvantages:

- Excess runoff is created because

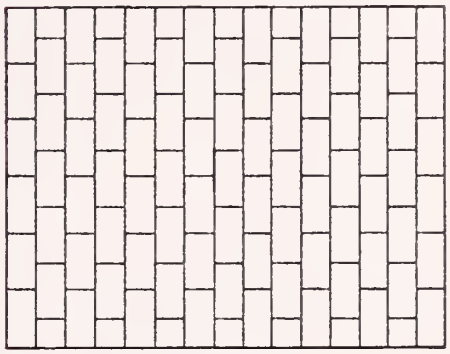
slides and photos by author



A sloped terrace



Herringbone



Running Pattern

water cannot seep through the cracks.

- Plant life is limited to the outside perimeter because of water needs.
- Frost causes upheavals in the patio. These damages can be costly.
- Bricks must be quickly placed in the concrete before it dries, This restriction limits the size and patterns of the patio.
- Concrete-brick patios are relatively expensive.

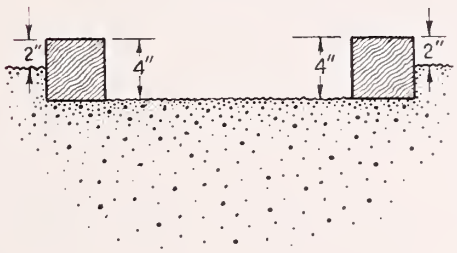
For public buildings, offices, sidewalks and other areas that have high pedestrian use, the concrete or combination concrete-brick method is good. For the average homeowner, however, it is too expensive and unsuitable.

Finely ground stone, also known as rockdust or grit, is used in making dry patios. It is used for the base and in between the bricks or flagstones instead of concrete. This material allows water to seep through more easily. These patios also lend themselves to a wide variety of patterns and overall shapes. It is easier and less expensive to build.

Because of the aesthetic and practical limitations of concrete and concrete-brick, I prefer the dry construction of patios and walks.

dry construction method

First, the perimeter of the patio or walk should be determined and marked out on the ground. It can be any size or shape. A railroad tie border can be made. The railroad ties should be sunk into the ground at least 4 in. The ties can be laid level, on a gentle slope or terraced, depending on the topography.



Take away the soil between the tie border. Usually we remove the soil to the 4 in. depth of the tie. Under normal drainage conditions that would be sufficient. If drainage is poor, however, excavate another 6 in. and fill the additional 6 in. with modified stone (mixed stone ½ in. to 1½ in.).

Put in 5 in. of grit as a base. This varies with the depth of the excavation. The base is then tamped, leveled and watered. The level of the grit base should be a brick's (or flagstone's) width from the top of the railroad tie. The reasons for using grit instead of sand are: grit is less expensive, easier to level, compacts to a harder surface when tamped, settles less and enables a more uniform patio to be built. One can walk on tamped grit without disturbing the surface, which you cannot do with sand.

Now the bricks or flagstones are laid in your desired pattern (see illustrations). Brush grit between the bricks and water it in to prevent shifting. Continue the process until the patio is finished.

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Herbert Bieberfeld operates the County Line Landscape Nursery (and garden center) in Harleysville. His home is right at the garden center, where he grows for his personal pleasure lots of rhododendron, azalea and holly. Bieberfeld thinks running a garden center and nursery is a great way to expose your children to horticulture. His two sons are planning to continue the business. His daughter is in the Air Force at present, but Bieberfeld hopes some day she, too, will participate in the business.



Wild bleeding-heart

AN AUTHOR CHOOSES GARDEN FAVORITES

Dicentra and Hypoxis

by Bebe Miles

Every few years or so a gardener ought to take stock of things—what's growing and how well, what's missing, what needs overhauling.

Having just completed a book on wildflowers, I had the opportunity for reevaluation thrust on me. What gave that overview a special fillip was that my collaborating artist H. Peter Loewer* offered me two of his original drawings.

Choosing the two I liked best was not nearly as easy as I had first envisioned. I could not help but think aesthetically. Some of the drawings were especially charming because of extra touches like a snail shell or an interesting seed pod. But for my own walls I also wanted art that meant something special to me and my garden.

Actually, Peter's original offer was for one drawing, but I found I could not choose between wild bleeding-heart and gold star-grass. When he heard of my indecision, he very kindly said, "Take two, they're small." Reproduced here, the illustrations certainly suggest why these two plants might be anyone's favorites and a possible choice when reassessing a garden inventory.

amazing bloom period

For the pragmatist, however, obvious beauty may not be enough. The most important asset of my two choices is a really amazing bloom season. *Dicentra eximia* puts forth its first color with the daffodils and continues until the first killing frost. My hypoxis begins flowering sometime in early May, has still been in bloom here in Bucks County as late as Thanksgiving.

There are few other plants from any place in the world that can match those records. That these are both native Americans should make them all the more alluring to Delaware Valley gardeners. They need no winter coddling whatsoever hereabouts, and I have never found any pest that laid them low.

Moreover, both plants, if correctly sited, will increase by seeding themselves. Neither could be termed weedy, but it should not take too many years to get a decent stand of either this way. (Increase from seed is always better if you start with at least two different individual plants of these species.)

Both these natives want the light condition that is easiest to provide: part sun and part shade. My hypoxis has done very well in a spot that gets filtered light most of the day. This patch is planted to the northeast of a small mountain laurel bush.

They [dicentra and hypoxis] need no winter coddling whatsoever hereabouts, and I have never found any pest that laid them low.

The dicentra does best if it is positioned on the eastern fringe of a tree or bush. This placement gives it good morning sun but some protection from the blazing rays of hot afternoon. You will find such attention to detail pays off in best summer flowers; planted where they get too hot, all the native dicentras sulk between peak bloom in spring and fall.

Neither genus demands special soil, but both do best in good humusy loam on the acid side. You can easily duplicate this kind of woodsy earth by mixing plenty of peat humus into the site before setting the plants in place.

As a further inducement to good blooming, mulch both plants well with wood chips at least one-half inch deep. This keeps the soil cooler in midsummer and helps conserve moisture.

One final horticultural hint: neither plant takes kindly to drought. If there is no rain for any extended period during their long blossoming, both plants should get a thorough hosing before the surrounding soil dries out too much.

Now to some specifics that appeal more to the gardener's aesthetic side.

Let's take the hypoxis first. It is variously nicknamed gold, hairy or yellow star-grass or even goldeye-grass. It does have a somewhat grassy foliage, but it is a member of the same amaryllis family to which belong the springtime daffodil and the autumn sternbergia.

The hypoxis is a daintier beauty, however, seldom growing much more than 6 in. high. The clusters of gold star-flowers are never quite as tall as the leaves, but they are held in such a way that the foliage does not obscure them. As I think of it during the season, I snip off the old heads, but my plants seem to bloom just as well whether I remember this detail or not. Thus you can encourage seeding without sacrificing bloom.

Because it is so diminutive, hypoxis should be planted in a niche where it is not threatened by larger, spreading neighbors. It is best appreciated by the gardener who kneels (whether to work or admire), but there is no reason it wouldn't show wonderfully in a raised bed.

My patch is along a walkway I take many times each day, so I get the most of its long, cheery greeting, but this is also an ideal addition to a suitable spot in a rock garden or the foreground of any planted area that gets some sun. It is a perfect companion for autumn crocus.

Incidentally, if you transplant some hypoxis bulbs carefully into a pot in early fall and bring inside, you will find them delightful terrarium inhabitants. Just make sure the soil around them does not get too wet.

There are several hypoxis species native to our southern states, but *H. hirsutas* has a natural range from Maine and Manitoba to Florida and Texas. Hence it is the hardiest and best for our purposes. The tiny bulbs are often offered by southern dealers in wildflowers.

Spring-planted bulbs will soon settle in for a long life of service, but I have even moved hypoxis during the summer, taking a generous shovel of soil to avoid

continued

*H. Peter Loewer has several books of his own in print, each with his clever pen and ink illustrations: *Bringing the Outdoors In* and *The Indoor Water-Gardener's Handbook*.



Yellow-star grass

root disturbance. Plant the bulbs only about an inch deep, then mulch well. This little amaryllis may not be as showy as many of its relatives, but it more than makes up for that by its tremendous flowering season. It blooms longer than any hardy perennial I have ever grown.

dicentra

Dicentra eximia is the eastern American cousin of the far better known Japanese bleeding-heart. The latter is admittedly a more flamboyant plant, but once its springtime show is over, it quickly goes dormant. Not so with several of its American counterparts. *D. eximia* bears several common names: plumy, fringed or wild bleeding-heart, turkey-corn and staggerweed.

Where its preferences for light, soil and moisture are sufficiently met, a mature plant makes quite literally a fountain of color. The graceful sprays of pink to rose heart-shaped flowers are borne above mounds of delicate foliage. Even when bloom is shy during a hot, dry summer, the lacy leaves are a definite asset for the half-shaded garden. Heights range from 6 to 18 in. with the soil and siting being important factors in how lush growth becomes.

If you want increase, the best idea is to spread the ripe black seeds around the mother plants and let nature do your work for you. With bought seed, plant in flats in late February and leave outside because this seed needs a period of cold to stimulate germination. The same techniques are recommended for the hypoxis.

Large plants of native dicentra can also be divided carefully in early spring. Give the cut sections extra shade and watering until they show recovery by good new growth.

Unlike the hypoxis, our wild bleeding-hearts include several species widely-spaced across the nation. Wildflower growers have also done some selection and hybridizing. In general the named cultivars yield larger flowers in brighter shades on longer stems than the true species. Not hard to find are Bountiful, Luxuriant, Summer Beauty, Valentine and Zestful. Some cultivars are sterile, however.

One of the genuine stars of the family is the pure white cultivar Sweetheart. I understand it is a form of the western *D. formosa.* Several nurseries offer this treasure, and it deserves a really special spot where its cool white flowers can be savored all summer. I have heard of but never seen albino forms of our eastern species.

Western wildflower growers also offer two good species from the Pacific Coast. *D. formosa* has pink flowers while *D. oregana* has creamy hearts tipped pink. Both have the everblooming habits of my favorite eastern form, but they spread by creeping stolons so may not always be as easy to situate. Hereabouts it is even more important to make sure these two species do not dry out during our hot summers.

So there you have it: my very favorite Americans. It is not to our credit as a mature nation that they are not yet in every garden, but we are coming of age.

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Bebe Miles is author of the recently published book *Wildflower Perennials for Your Garden,* Hawthorne Books, N.Y., 1976.

Multiflora Comes Full Cycle

THIRTY YEARS LATER: DEMOLISHING THE LIVING FENCES



photo by Christopher C. Peeples

Multiflora flowering in June

by Edwin A. Peeples

Edwin A. Peeples is a frequent contributor to *Green Scene*.

Recently the Department of Agriculture issued a bulletin that offers assistance in eradicating multiflora roses. They propose two eradication methods. One method uses Tordon 10K, a herbicide presumably specific to multiflora but one which, according to the bulletin, is not yet approved for use in Pennsylvania. The other method suggests hogging out the shrub with bulldozers.

We have come, therefore, full cycle in just 30 years. A scant 30 years ago, the Department of Agriculture urged farmers everywhere to plant multiflora around fields as living fences. As I was in at the beginning and am now confronted with the problem, a review of what happened may be of use. It may, at least, discourage future adventures in the profligate introduction of plants whose potentials have not been explored.

If the multiflora were the only such planting disaster our countrysides have known, my recital would be of only

continued

Multiflora continued

marginal interest. The multiflora is not the only such disaster. In addition to the introduction of multiflora in the east in 1946-48, we have had one prior eastern plague and another in the southern states.

Our wild honeysuckle, long out of control, which pulls down trees and chokes out vegetation in every field and young woodlot, is said to have been introduced by the railroads to hold the banks of cuts through the hills. That it held the banks with great efficiency, there seems to be no doubt. But no one anticipated its fecundity, once it was let loose in the east. Today, we have little hope of eradicating this nuisance vine.

Kudzu, *Pueraria lobata,* was introduced with similar zeal in the south just before World War II. Its farinaceous, tuberous roots would restore the earth farmed out by incessant cotton crops. Rich with a fragrance of grapes, ornamentally attractive and quick-growing, abundant with succulent, nutritious leaves, kudzu, according to advocates, would make the earth rich, provide plentiful, wholesome forage for cattle and be a blessing to one and all.

Actually, kudzu proved so rapacious and uncontrollable that it soon engulfed roads, railroads, houses and forests in a way even more sinister than the way honeysuckle engulfs them in the east. As a forage crop,kudzu was fully as rich as represented, but it proved an ideal refuge for rattlers and other poisonous snakes. The cattle that grazed kudzu found the meal nutritious but hazardous to their health. Now the south is trying to eradicate the abundant blessings of kudzu.

Like kudzu, *Rosa multiflora* is a plant which, according to Gray's *Manual of Botany,* was introduced and naturalized from East Asia. In East Asia, presumably some natural enemy keeps both of these plants in check.

In many ways, the multiflora is a beautiful shrub. It has a dense rose foliage amid which new shoots rise in shades from russet to blood colored. Each year, in late May or early June, the multiflora blooms in dazzling drifts of four-petalled, white roses, so dense they are like a snowfall. The fragrance is a combination of rose and orange blossoms and is as heavy and delicious as the fragrance of gardenia blossoms. In autumn, the shrub fruits in hips much like those on the firethorn, though not so large, so brightly colored nor so densely clustered. Birds love these hips, especially mocking birds for whom the multiflora provides abundant winter food and impregnable summer nesting places.

When the rose was urged upon us in 1946-48, farm bureaus offered at low prices bundles of 1000 seedlings. They looked very fragile. The above-ground portion was about the size and length of a lollipop stick. The root was a foot long.

Plant the multiflora! we were urged. It will make a dense enclosure of living barbed wire so tightly meshed and murderous that not even a shoat can squeeze through without being torn to shreds. The rose will grow to a height of 10 ft. and a diameter of 12 ft. In addition to providing a perfect fence for every kind of livestock, the multiflora will be beautiful with blossoms in June and colorful berries for the birds in autumn.

As a forage crop, kudzu was fully as rich as represented, but it proved an ideal refuge for rattlers and other poisonous snakes. The cattle that grazed kudzu found the meal nutritious but hazardous to their health.

Our next door neighbor, with whom we joined in planting, feared so fragile a plant would never survive the coarse planting methods we used: cracking the earth with a spade, dropping in the roots and closing with a footstep. For the hedge along her lane, she planted each seedling with a dibble and a tablespoon of transplantone. Roses planted her way shot up like Jack's beanstalk. Ours grew more slowly, but few died.

Our neighbor across the road, a canny Scot farmer, declined to follow us into multiflora. He did not know what the drawback might be, but there must be one. God never made anything so easy as planting a fence rather than installing one. The Scot proved right.

Once the multiflora bushes achieved size and authority, they did prove as attractive as represented. But they were by no means 100% efficient as an animal barrier. Their murderous briars were more heavily concentrated in the upper branches. The briars up to the one foot height tended to break away and not regenerate on old canes. So the hedge would not contain most fowls, lambs, shoats and other small animals. Also, as the growth tended to be irregular and snaggled, rather than uniformly dense, the hedges did not close out roving packs of dogs that liked to hunt and maim sheep.

In short, the multiflora hedge did not do what it was supposed to do.

Once planted, however, its adverse qualities were abundantly evident. Every hip that a bird ate was evacuated, encapsulated in rich manure, took hold and produced in no more than two years another huge and robust shrub. The living barbed wire that multiflora provided in hedgerows it also provided in the middle of fields. Nor was the seeding by birds the only process of reproduction. Wherever a branch touched the ground, it rooted. From those roots, further bushes sprang. In fields left uncultivated, ungrazed or unmowed for as little as two years, the multiflora grew so dense that even hunters, clad in leather and heavy denim, could not cross without being stripped nearly bare by the briars.

Nor did our prudent Scot neighbor come off unscathed. He escaped the ordeal of the original planting, but birds, sitting on his fence rails, planted a hedge for him as dense as any of ours.

All of us realized—years before the Department of Agriculture—that this briary pest had to be checked. We found that regular mowing would control the rose, but that such control was difficult, if the plants were allowed to reach any size and density, for the multiflora raised a crown of thick, woody shoots. Several mowings with a rotary or a Mott mower were needed to pulverize these crowns back to ground level.

In hedgerows, the rose became so inextricably entwined in trees—it will climb as high as 20 to 30 ft. into trees—that only laborious removal by hand clipping and hoeing were effective. That, or taking out the hedgerow, trees and all. Not only was the multiflora pernicious in itself, it provided a perfect forcing bed for honeysuckle and



photo by Alexander James Purring

Multiflora hips. Photo taken in January.

wild grape. In the early stages, in fact, the three plants seemed to be profoundly symbiotic, the rose supporting and lifting the grape and honeysuckle, the latter two entwining and binding together the rose to deter its removal.

By now, 30 years later, we have 25 acres of pasture-become swamp that is impenetrably dense with multiflora and its companions, grape and honeysuckle. We could have kept it clear by mowing, if it were not boggy and boulder-strewn. That the swamp is a fine wildlife refuge is indisputable. That it will remain one is dubious. The fairly brisk brook that flows through it, once the habitat of mallards and even egrets, has lost these inhabitants. The rose has grown too dense to allow these fowls to enter and leave safely. The rose also harbors such natural predators as raccoons and foxes.

So it's as well that the Department of Agriculture has finally recognized the curse that multiflora threatens to become and advocates eradication. Objectionable as the use of a herbicide is, one can only hope the Tordon 10K proves to be absolutely specific and that if it is, the state permits its use. For the notion of bulldozing vast terrains to eliminate multiflora is abhorrent.

Herbicides, however, are tricky substances. The herbicide purportedly specific to the multiflora may also, at the very least, prove specific to all roses. If eradicating the multiflora also leads to eradicating the harmless wild roses, the remedy will be tragic. If it goes even further and eradicates trees and other shrubs, owing to being no more than partially specific, we might as well use the bulldozers.

Such a result is not unthinkable. A decade ago my wife and I tried a herbicide represented as specific to honeysuckle. Being skeptical about such things, we tried the herbicide cautiously. We anointed only a few leaves of five honeysuckle plants. The honeysuckle died, all right. So did four poplar trees and two walnuts whose roots were twined with the honeysuckle.

Until some thoroughly tested method of eradication can be found, our only recourse is to the methods of mowing, grazing and cultivating that I have described and the few natural deterrents. For example, if the rose can be kept in check in woodlots and around other shrubs until a dense shade develops, the multiflora will tend to die. It does not flourish in shade. At the marges of woods, the honeysuckle, itself, ultimately turns on its symbiotic host, growing dense enough to girdle and pull down the canes so they are more easily mowed. By clearing the rose from the absolute edges of woods and mowing back into the denser shade of trees, the random hedge of multiflora can be reduced substantially.

But any true eradication program, to be effective, must be absolute. For the reseeding and random rooting process proceeds so rapidly that this Asian blight can replenish itself far faster than any half measure can limit it.

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Periodicals

"You are people of rare taste and sensitivity—knowledgeable, concerned, and curious about a wide range of subjects: art, history, literature, the scientific frontier, the environmental questions of our day, horticulture, gardening, civilization itself."

That is not the prelude to a request for funds but how *Garden Journal,* the publication of the New York Botanical Garden, recently described its readers. The description seems particularly applicable to users of the PHS periodical collection. Although we are brought together in the Pennsylvania Horticultural Society by our interest in horticulture in the Delaware Valley, we reach out all over the United States and beyond for information and associations that will make us better gardeners. It's in periodicals that we find the trends, discoveries and controversies as well as the seed material for books to come.

The 198 journals and 79 newsletters that PHS receives cover most of what's happening in horticulture in plant societies, science research efforts, horticultural societies and institutions, and trade organizations. A large number of them are directed toward popular gardening interests.

So, as "people of rare taste and sensitivity," what can you find among the periodicals to update and nurture your gardening interests? Consider the art and history of horticulture: in the emerging field of garden history and restoration a number of publications are available. One of the oldest is *Meehan's Monthly* published between 1859-1902. The newest is *Nineteenth Century,* published by the Victorian Society in America. In a recent article entitled "Japan at the Centennial" Americans visiting Philadelphia are described seeing their first bonsai and calling them "small, contorted trees." *Landscape Architecture* devoted its May 1976 issue to the emerging science of garden preservation titling it "Whose Time Is This Place?" Letters to the editor after the May issue indicate both delight and outrage (because *Landscape Architecture* seems to be looking backwards rather than leading the way). So many requests were received for that issue that it has been made available as a reprint (which circulates at PHS). *Garden History,* the journal of the Garden History Society (England) has scholarly articles of interest especially to travelers, and excellent book reviews of British publications. The *APT Bulletin* of the Association for Preservation Technology, and *Historic Preservation,* a quarterly published by the National Trust, are additional sources of garden research and preservation activities.

"The use of the ducks has cut the use of chemical insecticides on early rice from 77,000 kilograms in 1973 to 6,700 kilograms in 1975."

On the scientific frontier the *Plant Propagator,* the journal of the International Plant Propagators' Society, publishes information useful for professional horticulturists and experienced amateurs. Begun in 1955 by James S. Wells, the journal records the most recent findings in propagation techniques. Of interest also to professional horticulturists are *Hort Science,* published by the American Society for Horticultural Science, and the *Journal of the Arnold Arboretum.*

Environmental questions are discussed on an international level in *Environment.* In the November 1976 issue, Robert L. Metcalf reports in "China Unleashes Its Ducks": "The most fascinating example of pest management we witnessed was the combined use of *Tichogramma, Bacillus thuringiensis* toxin, and young ducklings for control of insect pests on early rice in Kwangtung Province. The Big Sand Commune . . . raises 220,000 ducks which are herded through the rice fields at saturation densities. Elaborate studies have shown that each young duckling consumes about 200 (mostly injurious) insects per hour. . . . The use of the ducks has cut the use of chemical insecticides on early rice from 77,000 kilograms in 1973 to 6,700 kilograms in 1975."

Of national interest to environmentalists, especially traveling ones, are *National Parks and Conservation Magazine,* and the *Nature Conservancy News.* The latter recently devoted a whole issue (Summer 1976) to the Virginia coast reserve, one of the last remaining natural seashore areas in the country. Local environmental issues are discussed in a new magazine, *Region,* a journal of Public Policy in the Delaware Valley.

Readers, even those "knowledgeable, concerned and curious," could be overwhelmed by the number of periodicals PHS receives that deal with general horticulture and gardening. A marvelous tool for the hard-pressed reader who wants to keep up with horticultural advances, new plants, techniques and products is the *Avant Gardener.* Published twice monthly in newsletter format, editors Betty and Thomas Powell cull information from the 400 magazines, journals, bulletins and press releases they receive each month. They list sources of plants and products giving complete address information. *Avant*



by **Mary Lou Wolfe**

Gardener also gives brief book reviews —42 in the last six months. Periodically, a complete issue is devoted to one subject. The recent issue about the Japanese garden (Vol. 8, No. 11), for example, was excellent.

To choose among the periodicals that "people of rare taste and sensitivity" read most when they are relaxing with "horticulture, gardening, and civilization itself" watch which periodicals the PHS staff take to lunch. *Horticulture, Garden Journal, Plants Alive, The Garden,* and *Landscape Architecture* are frequent choices of PHS brown-baggers, and members within range for lunch hour visits. *Horticulture,* published by the Massachusetts Horticultural Society, has consistently interesting articles with excellent photography and an uncluttered layout. *Garden Journal,* mentioned earlier as the publication of the New York Botanical Garden, is metamorphosing into *Garden* with color. It will be confused in name but not in size with another favorite, *The Garden,* journal of the Royal Horticultural Society. The small RHS magazine offers the lunchtime reader a real change of pace; pleached limes, the dimensions of the croquet court, and clematis for ten months of bloom make us realize we've leaped an ocean. The color reproduction is exquisite and there is always information adaptable for American gardeners, as in the article "The Microclimate of the Garden" by S. W. Burrage in Vol. 101, pt. 2.

Landscape Architecture, also mentioned earlier as of interest to garden historians, is the professional journal of the American Society of Landscape Architects, and most of its offerings emphasize future trends. Occasionally it stirs up a real storm about "civilization itself." The article "Japan Revisited: Self-destruction of an Island Paradise" in the January 1976 issue is an example. Author John O. Simond's article is full of strong statements like: "In their [the Japanese] compulsive drive to produce more and more goods and wealth, they have, for the time being at least, abrogated their traditions, their culture and even the responsible care of their land." Simond's article produced a number of letters to the editor. One, in " Cuts and Fills" says ". . . who are we to lecture the Japanese so paternalistically and pompously on how to manage their environment? It is not our cultural paradise, our quaint vacation retreat that they are mismanaging. It is theirs." This dispute about civilization, very much affects its horticultural aspects, and many PHS members would be interested in it and they would have strong opinions.

"People of rare taste and sensitivity —knowledgeable, concerned and curious" do come and use these publications that carry the newest and even the oldest horticultural information. The library binds 187 of the periodicals it receives and can supply subscription information if you would like to receive your own copies. You are welcome to browse and be informed in the library.

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digging for information



by Ed Lindemann

May is the month to add and replace plants in the garden. Questions that we receive at this time of year tell us that people are uncertain and apprehensive when it comes to buying and planting trees and shrubs on their property. If your planting job is a large one and it is economically feasible, I strongly recommend that you contract with a landscape nursery to do the job. Professionals are much better qualified to cope with the problems of equipment, muscle power and allotted time that can prove frustrating to the average "weekend" gardener. If your job is on a smaller scale it can prove to be an enjoyable and economical experience for you to do-it-yourself. My first advice is buy plants not on impulse, but rather out of need. Use equal care in choosing, transporting and planting each plant.

I like to see what I'm buying and so I buy plant material from local nurseries and resort to mail orders only for those items not available locally. I prefer to deal with a nursery that does some or all of its own propagation and growing or grows material on, rather than buying off the back of a trailer truck. Locally grown material is more acclimated to your climate, soil and temperature, thus reducing the shock of transplanting from one environment to a totally different one.

Trees and shrubs should be purchased because they are needed as replacements or as an additional stage of development in an already designed landscape, or as a carefully thought-out change to an existing landscape. In any case consider the size, form, color and compatibility of the plant in relation to its surroundings. The plant should be selected for the exact location it will occupy.

Unless you are buying a large number of plants, delivery costs will not be included and it will be up to you to transport the plants home. Handle the plants with respect and care. Balled and burlapped and container-grown material should be lifted, carried and supported from underneath. Do not lift or carry material by the trunk or stems. All material should be protected from exposure to wind, whiplash and sunburn during transportation. If plants will be protruding from the tailgate or trunk of an automobile or riding in an open truck it is advisable to wrap the exposed part of the plant in a tarpaulin to prevent rapid desiccation. If smaller plants are being transported inside a car, especially a stationwagon, take care not to leave the plants longer than is necessary especially with strong sunlight shining through the windows. Quickly rising temperatures found in closed automobiles will cause wilting and additional shock to the plants.

After the plants have reached their new location those that will not be planted within a few hours should be watered well and placed out of the direct hot sun and protected as much as possible from strong wind. If plants are going to be stored for more than 24 hours the containers or balls should be covered with some type of mulch and kept damp. If you do not have enough leaves, woodchips, or peat moss for this purpose used damp soil or wet newspaper.

I prefer to deal with a nursery that does some or all of its own propagation and growing or grows material on, rather than buying off the back of a trailer truck. Locally grown material is more acclimated to your climate, soil and temperature, thus reducing the shock of transplanting from one environment to a totally different one.

When actually planting the material make sure that the planting hole is one-third larger than the root mass. Gardening books will give a variety of formulas for mixing fertilizer, humus and peat moss into the soil returned to the hole. I don't feel that the contents of the mix are as important as the manner in which it is placed around the root ball. There should be no air pockets to cause the roots to dry out. I find that the best way is to add 6-8 in. of soil and then enough water to make a paste-like consistency, add another layer of soil, more water and so on. Mixing the soil and water together eliminates the air spaces. The plants should never be placed any deeper than they were growing in the nursery. Newly planted material will settle somewhat as the soil compacts. It is best to place the plants slightly on the high side to compensate for this settling. Larger material should be staked or guyed to prevent root damage caused by constant whipping back and forth in the strong spring winds. I usually remove such supports the following spring.

In addition to placing permanent plant material in the garden, May is the month to set out annuals and vegetable plants. The exact date will depend upon where you are located. In the Philadelphia area, May 15th is a safe date to set for placing tender plants in the garden.

All of the suggestions for buying and transporting shrubs and trees can be adapted to tender plants as well. Make sure that the plants you buy have been hardened off and are ready to go outside. Plants taken right from the greenhouse bench will have to be kept out of the direct sun and brought inside at night for a few days until they have become hardened. Flats of young plants should be kept well-watered before planting as severe wilting can be lethal to such young plants.

Shop around and check prices and quality. Again, I suggest that you look for someone who has actually grown the plants. Some impulse buying, especially with annuals can't be helped, but try to have some plan in mind and know the number of plants you will need. Think of spacing and remember that the small seedling will mature quickly into much larger plants. Don't be swayed by those plants that each have one big bloom on the top. Look for small, healthy, well-branched plants. Annuals that are in bloom should have the flowers removed when planting to make them stronger anyway.

If the young plants are growing in a flat or market-pak use a sharp knife and cut the medium in a grid pattern as you would a single layer cake. Each plant can then be lifted out of the flat with its root mass intact. If the plants are growing in fiber pots be sure to peel the pot away before planting. Plants that are in regular pots are more easily removed with less root damage if the soil is wet. Loosen the soil well in the individual planting holes and firm each plant by placing your hands with palms flat on either side and gently pushing down. After the new plants are in the ground, water well.

Tender or hardy, choose your plants with a purpose, transport them carefully and plant them correctly and you will be off to a good start for a successful gardening season. Strong healthy plants are the basis of a beautiful and fruitful garden.

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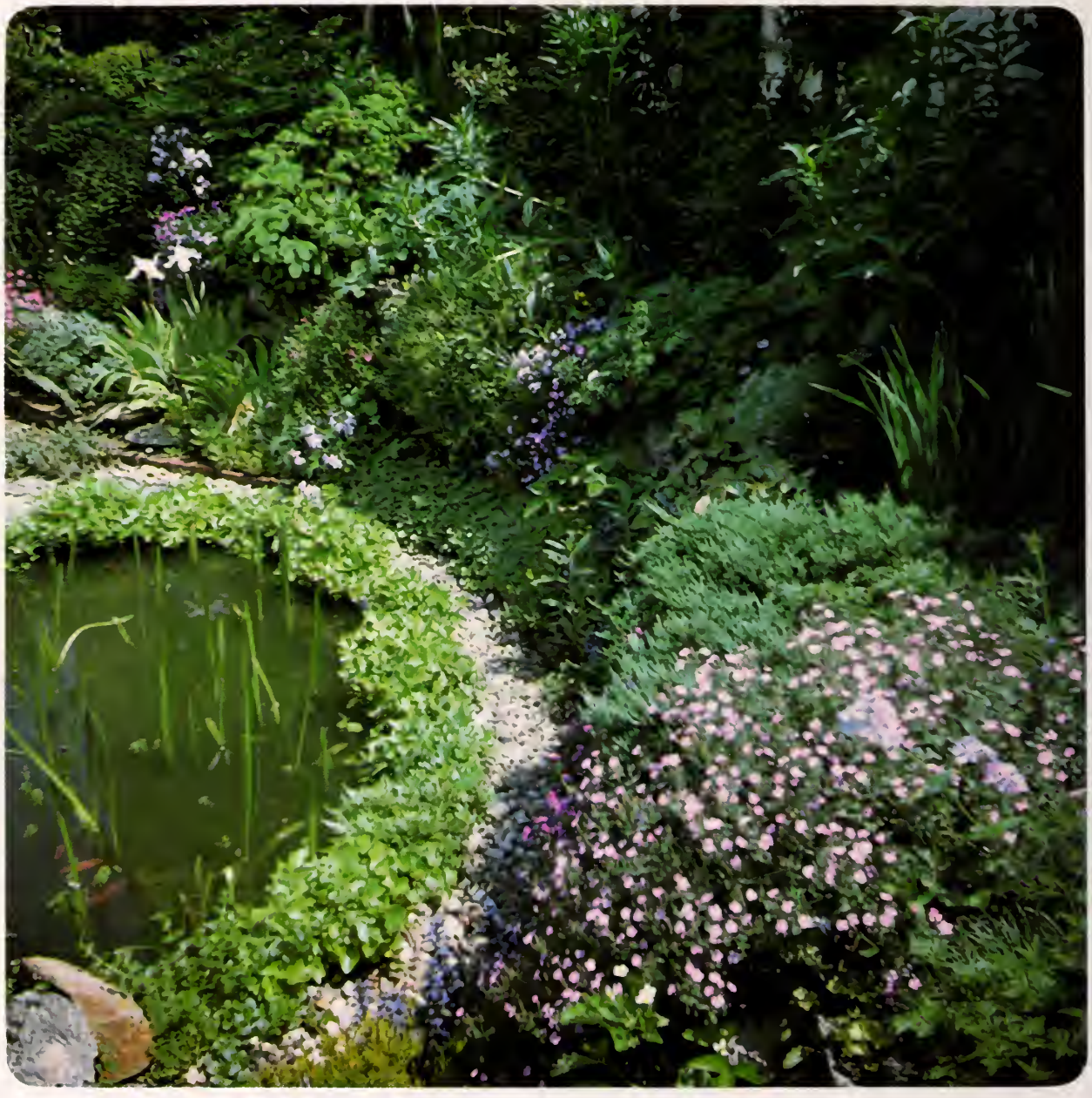
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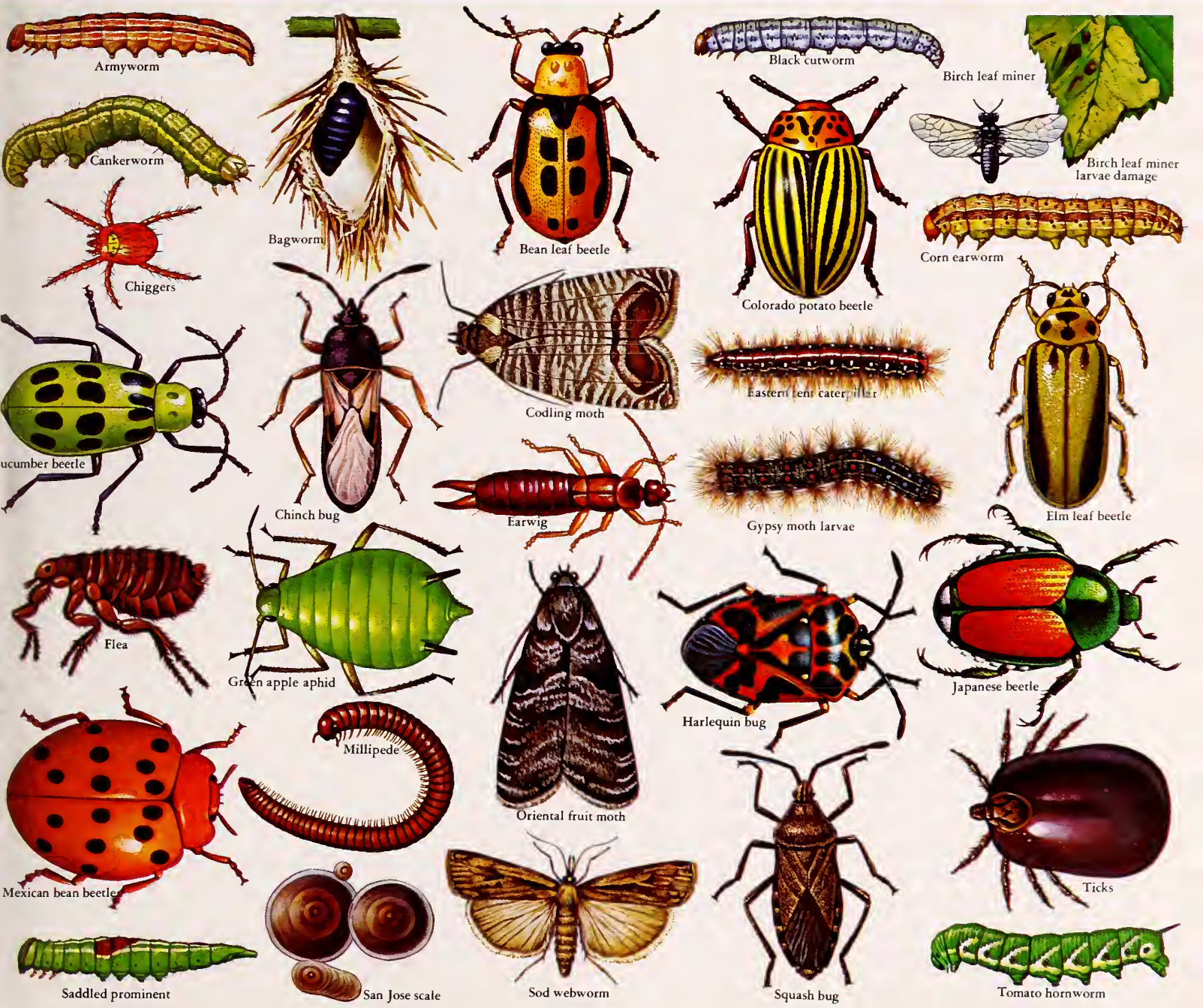


A City Garden. See story on page 3.

THE
green scene
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What's bugging you?

AN ISSUE DEVOTED TO PESTS





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THE green scene

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Back Cover: Common dandelion *(Taraxacum officinale)*. See story on page 25.
art courtesy Ciba-Geigy Ltd.

The Problem: Pests or Pesticides

EDITORIAL

What attitude should a Horticultural Society take vis-a-vis pesticides, which include insecticides, miticides, herbicides, nematicides, etc.? One of our members had no difficulty answering that question. For her, pesticides are the work of the devil. If the Society would not renounce them, root and branch, she would resign, which is what she did.

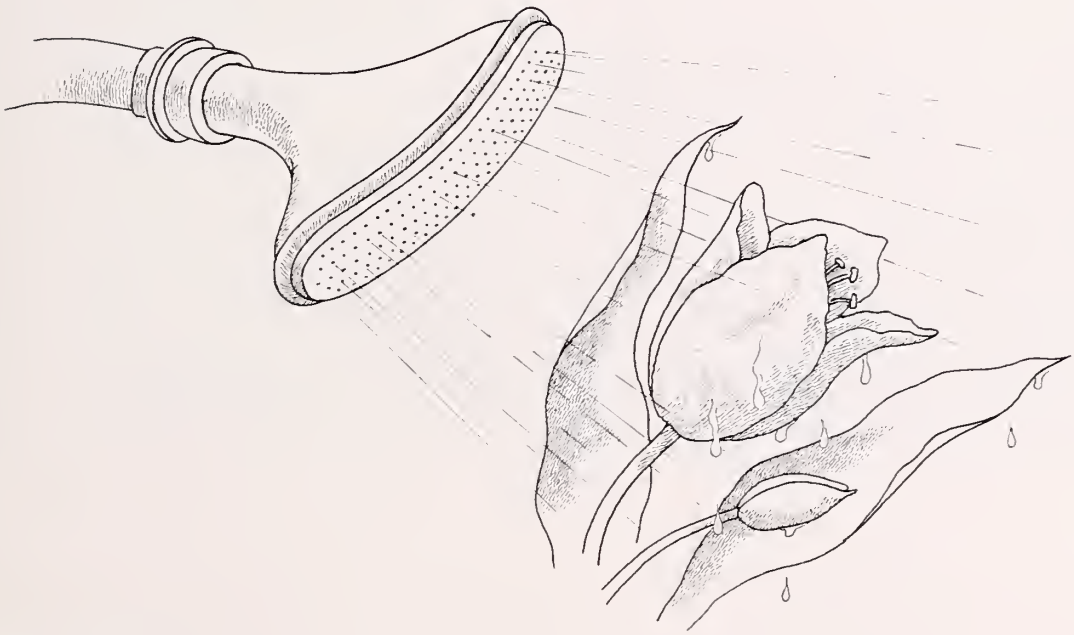
For our other members, and our readers in Maryland, New Jersey, New York and Delaware, the decision is not so easy. When we think about what are generally known as agricultural chemicals, we find, in the words of the advertisements, that there are no easy solutions; there are only hard questions. Here are some of the things that have to be brought into balance:

- Pesticides can't be dismissed as unadulterated evil. A significant part of humanity, perhaps as much as 25%, subsist on crops that are dependent on them.
- Most of the bad things you read and hear about pesticides relate to their use in agriculture. There are very few statistics about the use of these compounds in ornamental horticulture.
- The government has banned the worst pesticides and is setting up controls for the use of most others. It is not clear that we accomplish anything by imposing additional controls on ourselves.
- No one in authority has asked horticulturists to give up pesticides entirely. No one purports to say whether that would help. Conceivably it might hurt, by providing sanctuaries for insects, mites and weeds.
- No one seems willing to pass judgment on the new, short-lived biodegradable compounds. They might be less threatening than natural predators, which can get out of hand.
- Silent Spring is a melancholy prospect. But a spring without green leaves is worse.

In this unsettled state of affairs we do not see our way clear to taking a hard and fast stand. In our view, the situation calls for care and moderation. Don't use pesticides if you don't need to. I find that a forceful spray delivered by a flaring rose nozzle on the end of my garden hose will often do wonders toward cutting down insect and spider mite populations. As for herbicides, I find that hoeing, mulching, and hand weeding are both satisfying and effective; and they don't drift into nearby plantings.

And, of course, if you do use a pesticide, read the label when you buy and every time you use the product. And then read it again.

Ernesta D. Ballard



the insects' life cycles

Understanding how insects develop helps us to control them better.

by Stanley Green

Stanley Green is associate professor of entomology for the Pennsylvania State University. He is extension entomological and environmental agent for eight counties in southeastern Pennsylvania. Green received his B.A. and M.A. degrees from the University of Colorado, Boulder, Colorado. His doctoral dissertation completed in 1969 at Colorado State University, Fort Collins, Colorado, was about mites.

Scientists and dedicated amateurs have described and classified about a million species of insects. They comprise 80 per cent of all animals on our planet, and they are considered a highly successful group of animals.

They are found everywhere, from the arctic to the antarctic, and they have been found as high as 13,000 ft. carried aloft by wind currents.

Many insect species benefit us. They are food for birds and fish; they control other insects; they clean up carrion and break down decaying organic matter. They enable pollination of our crops and flowers and provide us with silk, wax, honey, biological stains and shellac.

Other insects plague us with their search for food. They feed on our animals (lice, fleas, maggots); they share our crops and our ornamentals (Colorado potato beetle and elm bark beetle); they feed on our stored foods (rice weevils, saw toothed grain beetles); they share our blood (mosquitoes and other biting flies, bedbugs, fleas, lice); they feed on our buildings and houses (termites, carpenter ants, carpenter bees); and they live with us as uninvited guests (cockroaches, silverfish).

We find it difficult to live with insects, but it would be impossible to live without them. Insects are inexorably enmeshed in our lives. Therefore we must learn about them.

They belong to the Class Insecta in the phylum arthropoda, a large group of animals that have jointed legs, a hard exoskeleton covering their bodies, and an open circulatory system (the blood is not confined to the blood vessels, but flows from them to bathe all cells of their body). Some examples of arthropods other than insects are crabs, lobsters, shrimp, pill and sow bugs, scorpions, spiders, mites, ticks, millipedes and centipedes.

The insects differ from these other arthropods in the following ways: adult insects have six legs (spiders and mites have eight); they possess one pair of feelers called antennae; many of them (but not all) have wings; they have three distinct body regions, the head, the thorax or middle region and the abdomen. On the head are a pair of multifaceted eyes called compound eyes, and often three additional, simple eyes, the antennae, and the mouthparts.

The mid region of the body bears the three pairs of legs, and if present either one or two pairs of wings.

The reproductive organs are contained in the abdomen.

Two basic types of insect life cycles are recognized. The first type consists of three developmental stages: (1) the egg, (2) the nymph and (3) the adult. These insects are said to have simple or incomplete metamorphosis. The term metamorphosis means change in (body) form. There is in this type a very slight change in body structure between the nymph or young insect and the adult.

We find it difficult to live with insects but it would be impossible to live without them.

Insects with incomplete simple metamorphosis include the grasshoppers, cockroaches, silverfish, thrips, earwigs, termites, aphids, bed bugs, and lice.

The second type of development known as complex or complete metamorphosis consists of the following stages: (1) egg, (2) larva, (3) pupa, and (4) adult. Here the young stage or larva not only bears little resemblance to the adult it will become, but also lives in a different environment and has a different diet from the adult. Insects with complete metamorphosis include moths, butterflies, mosquitoes and flies, fleas, beetles, ants, wasps and bees.

Insects have a tremendous reproductive potential, which partly accounts for their biological success on earth. It has been estimated that one female aphid could from April through mid-August produce 564 quadrillion offspring. By October she could have given rise to over one septillion offspring.

continued



USDA Home & Garden Bulletin No. 159

A. Mature grub in spring, feeding on roots in underground burrow. B. Pupa in underground cell. C. Adult beetle, emerges from earth. D. Beetles feeding on smartweed. E. Beetles feeding on grape leaves. F. Beetles feeding on apple leaves. G. Female beetle depositing eggs in soil at bottom of shallow burrow. H. Egg. I. Egg hatching, and young grubs. J. Partly grown grub in fall.

It has been estimated that one female aphid could from April through mid-August produce 564 quadrillion offspring. By October she could have given rise to over one septillion offspring.

Obviously all the descendents insects are capable of producing are never realized. Predators, parasites and disease exact their toll, and environmental conditions such as temperature, humidity and food availability drastically reduce their final numbers.

Although, as previously mentioned, there are many insects from which we derive benefits we must be able to deal effectively with those insects that annoy us.

To successfully control insect pests you must correctly identify them and learn their life cycle. You can then determine how to control them and when to control them.

chemical control and timing

Japanese beetles emerge from the soil in the latter part of June. They deposit their eggs on the soil in July and the larvae, called grubs, hatch and remain close to the soil surface from July to September. Effective grub control is only possible while these grubs are close to the surface. If you try to spray for them in October-November or later they will be too deep to be destroyed. They again come near the soil surface in May and June at which time they pupate (form a cocoon). The mature grubs and pupa are not readily controlled by pesticides. Thus the timing from grub control during July and August is essential to their control.

The spotted and striped cucumber beetles carry bacterial wilt to cucumber and related vine crops. This disease appears suddenly, almost overnight. The vine, which appears healthy and full of fruit, suddenly wilts and dies.

The beetles infect the plants when the plants first germinate, but the disease symptoms may not show up until many weeks later. To control this problem you should apply a pesticide to the soil as the plants begin to break through the soil. If you wait too long to control the beetles it will be too late to prevent the wilt.

The control of scale is most effective when the crawlers or nymphs hatch, and are migrating about on the stem and branches of the plant. The identification of the scale is vital to their control. For example, control euonymus scale in mid-May, azalea bark scale from late June to mid-July, and hemlock scale from early to mid-July.

The timing of pesticide application is also critical in the life cycle of the gypsy moths.

Gypsy moths are best controlled in mid-May while their caterpillars are small. The mature caterpillars, pupae, and egg masses are fairly resistant to pesticides. Once the caterpillars get to the resistant stage you can get rid of them by tying a band of burlap around the tree. The caterpillars feed on the leaves during the evening but migrate downwards before daybreak. You can collect them from under the burlap where they accumulate and drop them in kerosene. You then have the job of hand scraping the egg masses through late summer, fall or winter.

These are just a few examples of how understanding the life cycle of pests enables you to plan your attack when they are at their most vulnerable.

The availability of pesticides, however, should not lead us to neglect preventive measures. Good sanitation, covered elsewhere in this issue, will help reduce pests in your garden: for example, slugs, millipedes, earwigs and sow bugs thrive in moist habitats and feed on decaying vegetation. Simply removing dead and decaying leaves from your garden, thinning out your plants or pruning your shrubs will create drier conditions and cease to support these populations of pests.

If you have only a few plants you can control some pests manually. For example, bagworms: they mate in September and deposit their eggs inside their bags on pines, spruces, arborvitae, junipers and some deciduous plants. These eggs overwinter in the bag until early June when they hatch. You can control their spread by removing all bags by hand through the fall, winter or early spring. Similarly, the hornworm caterpillar cannot be missed on tomato plants and can be picked off easily by hand and therefore don't require pesticides.

The Cooperative Extension Service has prepared a number of publications about specific insect problems, so don't hesitate to contact your local agent.

Insects are ubiquitous; they greatly outnumber us. The more we learn about them, the more we can control them.

●

Books About Insect Life Cycles

Butterflies and Moths, Robert T. Mitchell & Herbert S. Zim. Golden Press, NY, 1964.

A Field Guide to the Insects of America North of Mexico, Donald J. Borror & Richard E. White. Houghton Mifflin Company, Boston, 1970.

Insects, Herbert S. Zim & Clarence Cottam. Golden Press, NY, 1956.

Insect Pests, George S. Fichter & Herbert S. Zim. Golden Press, NY, 1966.

common plant pests

by Ed Lindemann and Jane Pepper

Ed Lindemann is the PHS horticulturist.

Jane G. Pepper is a student in the Longwood Program in Ornamental Horticulture at the University of Delaware, as well as an avid home gardener.

To compile this list of common plant pests we reviewed the kinds of questions we've received throughout the year on the horticultural hotline and by letter. We've listed those plant pests that people seem to have the most difficulty identifying or coping with.

Often it's hard to help people with their pest problems because they don't have enough information about the problem. We suggest you begin by observing: what does the pest look like; when is it around; is it a sucking or chewing pest (chewers leave holes in the leaves, suckers discolor the leaves); is there a residue; try to describe it. You'll probably get better help also if you can provide a sample of the affected plant. Pesticides are listed by common name. See page 12 for brand names.

house plants

HOST	PEST	CONTROL
Common on cooler habitat plants, for example, ivy, geranium, gardenia or kalanchoe.	**Aphid.** Tiny white, black, light green or yellow sucking insects. They cluster on buds and new shoots.	Wash away with strong spray of water; spray with malathion.
Large potted plants that go out for the summer.	**Earthworm.** Same as those found in outdoor gardens. Look for droppings on surface of soil in pot.	Water with solution of one teaspoonful of permanganate of potash in enough water to create a deep pink colored solution.
Succulents are very susceptible.	**Mealybug.** Small white cottony looking insects found at nodes and in leaf axils.	Remove individual insects with a Q-tip dipped in alcohol. Spray with malathion.
Found on just about all house plants.	**Red spider mite.** Not true insect; they have four instead of three pairs of legs. Difficult to see with naked eye. Look for webbing on underside of leaf. Shake leaf over white paper. Mites that come off will create a reddish-yellow dust.	Dicofol. Once pest is controlled, bi-weekly washings will help prevent return. Keep humidity high.
Ferns and leathery leaf plants are very susceptible.	**Scale.** Small white or brown blister-like shield, will scrape off with fingernail. Leaves are sticky to touch.	Malathion, spray or dip.
Can be found on any container-grown plant; particularly prevalent in plants grown under lights.	**Springtail.** Small fast-moving insects that come to the soil surface when plants are watered.	They feed on organic matter in the soil and do not harm plants. If squeamish, spray with malathion.

continued

Earthworm

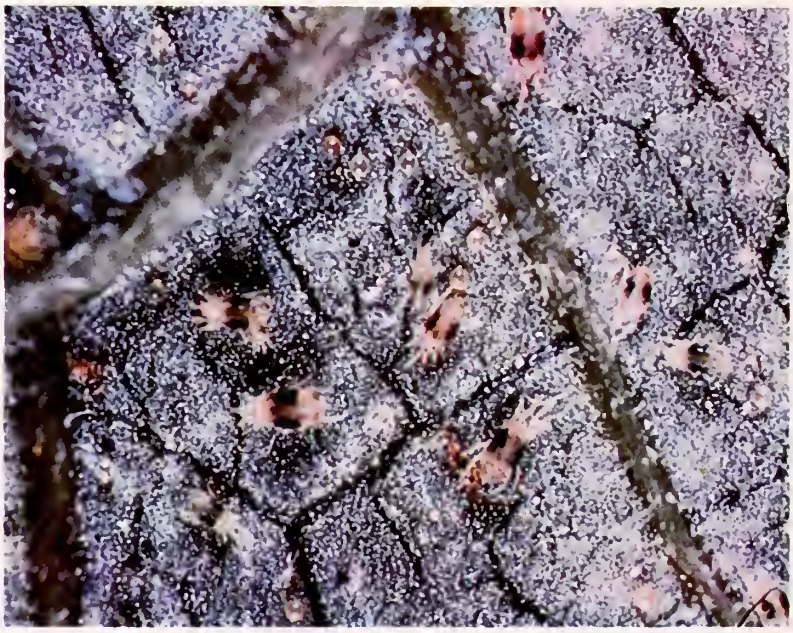


Mealybug

photo by E. D. Ballard



other photos
by Ray R. Kriner



Red spider mites

Recommended Books

All About Vegetables, Chevron Chemical Company, 1973.

The Complete Book of Greenhouse Gardening, Henry T.& Rebecca T. Northern. Ronald Press, 1956.

Diseases & Pests of Ornamental Plants, Pirone P. Pascal. Ronald Press, 1960.

The Gardener's Bug Book, Cynthia Westcott. Doubleday & Co., Inc., 1964.

The Green Thumb Book of Fruit & Vegetable Gardening, George Abraham. Prentice Hall, 1970.

Grow It Indoors, Richard W. Langer. E. P. Dutton, 1975.

The New York Times Book of Vegetable Gardening, Joan Lee Faust. Quadrangle/ The New York Times Book Co., 1975.

Organic Plant Protection, Roger B. Yepsen. Rodale Press, 1976.



Taxus weevil

ornamentals

HOST	PEST	CONTROL
All garden plants	**Aphid.** Assorted sizes and colors; suck juices from new shoots and buds. Appear from May till frost.	Isotox, malathion. Follow directions on the label.
All plants are susceptible.	**Beetle, Japanese.** Bronze colored with blue-black head. Appear anytime after mid-June.	Isotox, diazinon, carbaryl. Follow directions on label. (Control the same for all beetles on ornamentals.)
Dogwood, lilac and iris very susceptible.	**Borer.** Larvae inside stem or trunk and usually not seen until plant wilts. Look for holes in stem or trunk and "sawdust" residue. May appear at anytime.	Lindane spray or paste. Follow directions on label.
Azalea and andromeda are very susceptible.	**Lacebug.** Tiny 1/8-in. long, has lacey wings with brownish-black markings on the wings. Appears from mid-May on.	Isotox
Birch, holly, azalea, pine, spruce.	**Leaf miner.** Larvae feed on inside of leaf when they hatch. Appear in late spring and early summer.	Lindane. Follow directions on label.
Common on euonymous, hemlock, pachysandra, cotoneaster and many other plants.	**Scale.** White or brown blister or bubble-like insects, may be hard or soft with or without a dark center. Usually on leaves or along stem. May appear anytime during the growing season.	Isotox, malathion. Follow directions on label. Dormant oils used on some woody plants as control in late winter. Check label.
Rhododendron and yew are common hosts.	**Weevil.** Black vine weevil 3/8-in. long. Black color with ribbed wings, eats margins of leaves and destroys roots. Appear from mid-June through July.	Diazinon, carbaryl, malathion or Isotox may help control.

vegetables

HOST	PEST	CONTROL
Asparagus	**Asparagus beetle.** Small black beetle with three yellow squares on each wing. Larvae are olive green with black heads; they feed on new shoots in early spring.	Hand pick, dust tips with rotenone or carbaryl as soon as tips appear. Use malathion only after cutting season is over.
Beans: lima and snap	**Mexican bean beetle.** Yellow with black spots. Yellow larvae. Attacks plants throughout growing season.	Hand pick; rotenone or carbaryl (dust). Keep picking orange egg masses.
Cabbage (and related plants), brussel sprouts, broccoli, cauliflower, kohlrabi	**Aphid.** Tiny green or powdery blue insects cluster on leaves and stems at anytime during the growing season.	Carbaryl or malathion (do not use malathion within seven days of harvest).
	Cabbage worm and cabbage looper. Green caterpillar appears from June on.	Dust with carbaryl.
	Cabbage white maggot. Feed on roots and stems. Watch for this pest early in spring when plants are first set out.	Diazinon; follow label directions.
	Cutworm. Soft, flat caterpillars, cut stems off at ground level. Appear early when plants are first set out.	Place stiff paper collars around young plants, bury collars 1 in. into soil or use diazinon. Follow label directions.
	Flea beetle. Tiny black beetle leaves shotgun holes in leaves. Can appear anytime during growing season.	Rotenone, wood ash or flour dust.

continued

vegetables continued

HOST	PEST	CONTROL
Carrot	**Carrot rust fly.** Maggots cause deformed carrots. Usually appear in late spring and again in late summer or early fall.	Sow seed after June 1 and harvest by early September to avoid maggots. Keep garden weed free.
Corn	**Corn borer.** Light color with small dark spots in rows. Appears early summer.	Dust tassels with carbaryl as soon as they appear; repeat at three to four intervals.
	Corn earworm. Attacks mid and late season corn.	Apply mineral oil to tassels when they first appear, or dust tassels with carbaryl at two to three day intervals until silk turns brown.
Cucumber	**Striped cucumber beetle.** Small black beetle with yellow stripes, spreads bacterial wilt. May appear at anytime during growing season.	Dust with malathion or carbaryl. Start when plants are young.
	Squash bug.	See under squash.
	Vine borer.	See under squash.
Eggplant	**Colorado potato beetle.** Orange beetle with black stripes. May appear throughout the growing season.	Dust or spray with malathion or carbaryl.
	Flea beetle.	See under cabbage.
	Horn worm.	See under tomato.
Lettuce	**Slug.** Look for silvery trails. Damage done at night.	Place beer in shallow containers; slugs are attracted to beer and drown. Or use baits containing metaldehyde.
Melon	(Same as cucumbers)	
Onions	**Onion maggot.**	Diazinon
	Thrips. Suck juices from tops leaving them whitened and curled. Bulbs do not develop.	Spray with nicotine sulfate or malathion. Do not spray within one week of harvest.
	Both pests attack bulbs after they have started to grow.	
Squash	**Squash bug.** Small brown bug, spreads bacterial wilt.	Hand pick adults and eggs. Bugs will collect under boards or shingles placed near plants at night and can be destroyed in the morning. Spray with malathion. Remove all old vines in the fall to prevent wintering over of insects.
	Squash vine borer. Unnoticed till vine wilts. Look for hole in stem and "saw-dust" residue.	Cut bores out with a sharp knife. Try to cover damaged stem with soil to induce rerooting. Spray with methoxychlor, carbaryl or malathion at the end of June and beginning of July. Remove old vines in the fall.
	Both may appear anytime during growing season.	
Tomato	**Cut worm.**	See under cabbage.
	Flea beetle.	See under eggplant.
	Horn worm. Large 3 in. - 4 in. green worm with red horn. Watch for in mid-summer.	Hand pick. Dust with carbaryl.



Striped cucumber beetle



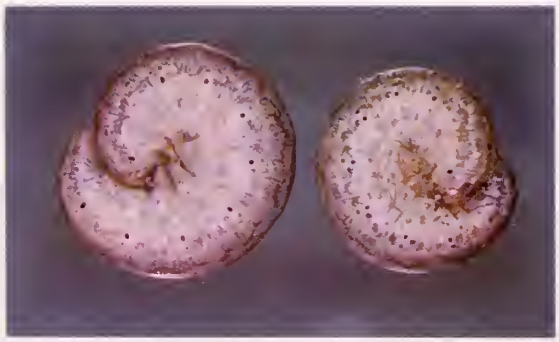
Cabbage maggots on cabbage roots



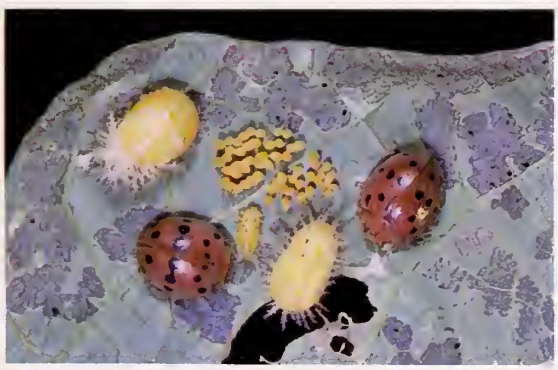
Cabbage looper



Corn earworms



Cutworms (asparagus)



Mexican bean beetle (life stages)



Squash vine borer larva on opened vine

Whitefly is one of the most troublesome of all pests for gardeners. It is becoming increasingly difficult to control. But there are at least two commonly available formulations on the market containing pyrethrum and rotenone, both botanical pesticides that gardeners find effective in combination for a variety of pests on ornamentals including whitefly. However, these pesticides are only effective for three days and for good control should be repeated at three-day intervals at least seven times. Be sure to read the label carefully.

THE USE OF PESTICIDES

by Stanley Green

Every year we look forward to starting our new gardens. That is, until we find our first insect and the discovery can take all the fun out of gardening unless we know what to do.

There are several ways to combat garden pests, but the most common way is by using pesticides.

The retail market presents us with an array of pesticides. There are about 550 basic chemicals manufactured in the United States to control pests. These chemicals are produced into some 8000 different formulations (dust, wettable powder and emulsified concentrate, for example). Finally, there are close to 50,000 different products registered in the U.S. for us to buy.

A pesticide is defined as a chemical that kills a pest. A pest is any unwanted animal or plant. We all know examples of animal and plant pests: aphids, cutworms, Japanese beetles, crabgrass, dandelions, poison ivy.

Pesticides can be subdivided into groups depending on the type of pest they kill. For example, those that kill insects are called insecticides; fungicides kill fungi; herbicides kill weeds; nematicides kill nematodes or roundworms.

The value of pesticides to our food supply and to human health cannot be underestimated. It is believed we lose about $15 billion in the United States each year when pests (insects, mites, plant diseases, etc.) destroy our crops and stored products, and that the world monetary loss from pests is $75 billion! It is estimated that about one-third of all food produced worldwide is lost to pests.

All pesticides are poisonous; however, they do vary in their degree of toxicity. Specific words signalling the level of the product's toxicity are found on the product label.

Highly toxic pesticides have the words **Danger-Poison** and the skull and crossbones printed on the label. These products are so toxic that swallowing even a few drops of this material could kill a person.

Moderately toxic pesticides have the signal word **Warning** on the label. The lethal dose for pesticides in this toxicity class ranges from one teaspoon to one ounce.

The third class of pesticides has the word **Caution** on the label. Here the lethal amount is from one ounce to one pint (or one pound). These pesticides are considered as slightly toxic materials.

A fourth class of pesticides also carrying the signal word **Caution** on their labels are those known to be relatively nontoxic or almost nontoxic pesticides. You would have to consume more than a pint of this material for it to kill you.

Remember, no pesticide can really be considered nontoxic.

restrictions

All pesticides must be registered federally with the Environmental Protection Agency (EPA), and in Pennsylvania with the Pennsylvania Department of Agriculture.

The Environmental Protection Agency is presently reclassifying all pesticides into two groups. One group is the restricted use pesticides. The other is the general use pesticides. After October 21, 1977, anyone who wants to buy or use the restricted pesticides must be licensed and certified by the Commonwealth to do so.

What are the restricted use pesticides? The Pennsylvania Department of Agriculture has designated as restricted pesticides all those that bear the signal words **Danger-Poison** and have a skull and crossbones pictured on their labels.

For the immediate future at least, the home gardener should be able to obtain most of the insecticides, fungicides and herbicides needed to control his pest problems. However, once the complete restricted list becomes available from EPA, certain pesticides may be removed from your arsenal of weapons.

How can you find the right pesticide for the pests you find in your garden? First, correctly identify the pest. There are various books and pocket guides that have many illustrations and descriptions of insects. If you cannot identify your pest with these, ask for help from a specialist such as a county extension agent, a museum currator, an entomologist, the horticulturists at PHS, or perhaps someone in a local arboretum.

Once you know what your problem is you must then decide how to deal with it.

Certain pests require specific pesticides. If the wrong one is used not only will you not get control, but you can seriously damage your plants, yourself or the environment.

Pesticides should only be used if they are called for. Many insects are not pests or may not be present in numbers sufficient to require this kind of control. Often pests may be successfully controlled without pesticides.

When pesticides are required, select the proper one. The label will contain the chemical name, the trade or brand name and the common or generic name. The trade name will be capitalized and will have the registered trademark (R).

I have listed below some of the most commonly recommended pesticides, giving their trade and common names along with some of the pests they control. I did not include the chemical names because they are not useful to the lay person and only create more problems than they solve. For example, the insecticide rotenone (common name) has the following chemical name: 1,2,12,12a-tetrahydro-2-150 propenyl-8-9-dimethoxy-(1) benzopyrano (3,4,-6) furo (2,3-6)(1) benzopyran-6 (6aH)one.

NOTE: The pesticides listed are, with the exception of Isotox, single formulations. There are many pesticide combinations commonly used, too numerous to list here. For example, Isotox, mentioned elsewhere in this issue is a combination of pesticides (an insecticide, a fungicide and a miticide), which will kill insects, fungi and mites. These pesticides are more expensive than single formulations and they should only be used when more than one pest is a problem.

GENERIC OR COMMON NAME	TRADE NAMES	SOME RECOMMENDED USES
carbaryl	Denapon, Dicarbam, Hexavin, Karbaspray, Nac, Ravyon, Septene, Sevin, Tricarnam	numerous insect pests of fruits, vegetables, turf and ornamentals
chlorobenzilate	Acaraben, Akar, Benzilan, Folbex, Kop-mite	mites
chlorpyrifos	Dowco 179, Dursban, Lorsban	household pests, chinch bugs, earwigs, peach tree borer, ticks
diazinon	Basudin, Dazzel, Diazatol, Diazejet, Diazinon, Diazol, Diozide, Gardentox, Neocidol, Nucidol, Sarolex, Spectracide	numerous garden, lawn and household insects
dichlorvos	Cekusan, DDVP, Dedevap, Derribante, Derridan, Divipan, Herkol, Mafu, Marvex, Nogos, No-Pest, Nuvan, Oko, Phosvit, Vapona	household pests, mushroom flies, aphids, spider mites, caterpillars and thrips
dicofol	Acarin, Kelthane, Mitigan	mites
dimethoate	AC-18682, Cygon, Daphene, De-Fend, Demos-L40, Dimethogen, Fostion, MM, Perfekthion, Rebelate, Rogor, Roxion, Trimetion	a range of insects and mites on ornamentals and some fruits and vegetables
dinocap	Crotothane, Karathane	mites and powdery mildew on various fruits, vegetables and ornamentals
Isotox (see note at end of list)		
Kelthane (trade name often used as common name)	See dicofol	
lindane	Forlin, Gamaphex, Gammalin, Gammex, Gammexane, Lindafor, Lindagam, Lintox, Novigam, Silvanol	various borers in shrubs and trees
malathion	Cythion, Emmatos, For-mal Fyfanon, Karbofos, Kop-Thion, Kypfos, Malamar, Malaspray, MLT, Zithiol	for a wide variety of insect pests (aphids, spider mites, scale) of fruits, vegetables, ornamentals
metaldehyde	Antimilace, Bug-Getta, Namekil, Snarol	slugs and snails
metasystemox	Metasystox-R	systemic insecticide and acaricide (ticks and mites)
methiocarb	Draza, Mesurol, Slug Getta	slugs and snails in non-food gardens
methoxychlor	Maralate, Methoxide	various insect pests of fruits, vegetables, ornamentals
perthane	Perthane	clothes moths, carpet beetles, pear psylla, and loopers on vegetables
propoxur	Arpocarb, Baygon, Blattanex, Suncide, Tugon Fliegenkugel, Unden	household pests, turf insects, aphids and leaf hoppers
pyrethrum	Pyrethrum	household pests, pet sprays, aphids, flea beetles and leaf hoppers
resmethrin	Chryson, FMC 17370, NIA 17370, NRDC 104, SBP-1382, Synthrin	household pests, whitefly on ornamentals
rotenone		insects and mites on vegetables, flowers and ornamentals
Sevin (trade name commonly used)	see carbaryl	

check labels

Pesticides must be used with care and in accordance with all label directions. The proper product must be used against the target pest, at the right time and in the right amount. Do not use pesticides where they are not needed; do not use them at a higher dose than directed. Store them safely.

Read the entire pesticide label carefully at least five times:

1. **Once before you buy it:** Is the pest listed on the label? Is it too toxic for me to use?

2. **Before you mix it:** How do I dilute it?

3. **Before you spray:** How much do I use? What areas or plants should not be sprayed with it? When can I eat the crop after spraying? What protective clothing or respiratory device should I wear?

4. **Before you store it:** Where can I store it and under what conditions? (temperature, humidity?)

5. **Before you dispose of it:** How can I get rid of unwanted quantities? How can I get rid of empty containers? (See box for disposal information.)

nonchemical controls

Numerous claims are made regarding the effective control of various pests from vegetables by planting certain pest repellent plants between the vegetables. I know of no scientific evidence to support these claims, but there may be some value to them; only time and research will tell.

Here are some nonchemical control practices:

- Plant marigolds between bean plants to control Mexican bean beetles.
- Plant marigolds between cucumbers to repel cucumber beetles.
- Plant mint leaves between rows of cabbages to control cabbage maggots and cabbage moths.
- Plant nasturtiums or onions between a number of vegetables to keep down aphids.

If you wish to test nonchemical methods of pest control, set up your garden plots scientifically. Use a control section in which you grow crops without any repellent companion plants. You will be able to check decisively any differences between the control section and the test area.

If you try a nonchemical method without a control section and find your plant insect-free, you don't really know if that would have happened anyway or if the plants did in fact repel the pests.

Remember, pesticides are important tools, but they must be used cautiously. How effectively and safely you use them depends on you.

continued

SEE NEXT PAGE FOR IMPORTANT BOX.

PESTICIDES continued

SUGGESTIONS FOR DISPOSAL OF PESTICIDES AND CONTAINERS

Remember that there is no such thing as an "empty" pesticide container. Residues can remain even after rinsing. However, the Environmental Protection Agency (EPA) has published some recommendations that apply to disposal of containers that once contained chemicals.

According to the recommendations all noncombustible containers of glass or metal should be rinsed three times, with the water from each rinse added to the sprayer being used. After this, the container may be disposed of in trash collections or landfills, or even recycled.

Containers for mercury, lead, cadmium, parathion thallium or arsenic, are too dangerous to leave around. Check with the Environmental Protection Agency about these containers.

If you plan to save any chemicals, LABEL them properly. It's too easy to forget what is in an unlabeled container. Put containers in a locked storage area. Protect them from freezing and from moisture. Many liquid formulations will freeze and break their containers, creating a hazard. Other liquid forms will drop out of solution at low temperatures. Read the label for storage directions.

At a recent brainstorming session in Southeastern Pennsylvania, representatives from several agencies locally responsible for pesticide safety added a few other suggestions:

If you have a small quantity that you want to get rid of, consider using it until it runs out (according to label directions, of course).

If, on the other hand, it's a large, unopened quantity, give it to a garden center, pest control operator or friend or neighbor who may need it. If it's been opened (and is possibly unlabeled), wrap it carefully and very securely to keep it out of the hands of foraging children or animals, and put it in the trash.

If none of these recommendations is feasible, put it under lock and key.

Finally, if you have reached the height of frustration, here are some places to call in the Philadelphia area (area code 215): Cooperative Extension Service, Stanley Green, HA 4-0650; Department of Environmental Resources in Norristown, 631-2400, the State Agricultural Department at 368-3000 (usually problems with large quantities); or the Environmental Protection Agency, 597-9870.

Unfortunately, responsibilities vary from area to area and even then are not firmly pinned down. Expect to spend some time phoning around. For those outside of Philadelphia, we suggest you start with your local cooperative extension service agent; he or she will refer you to the best agency or person to handle the problem locally.

why a professional

by Paul McFarland

Paul McFarland's avocation is gardening; by profession he is an arborist who manages properties in the Delaware Valley area.

Why a professional arborist? Let's start with the economics of the situation.

A 600 gallon spray rig costs $16,000. To control pests on a 30, 75 or 120 ft. tall tree, you need a volume of water with a pressure of about 500 lbs. No home faucet or small sprayer will deliver the volume and/or pressure needed.

Preventive spraying on particular species of trees for hard to control and commonly found insects is the cheapest and most beneficial method to protect the environment.

Once certain insects attack a tree or bush, they can inevitably kill the host plant; for example, let's say the elm bark beetle transmits the disease to the elm. The tree must be treated immediately upon the first sign of wilting or flogging; otherwise, the disease will spread through the tree quickly. If, however, a preventive foliar spray is applied, we have a good chance of killing the beetle.

If an oak is infested with pit making oak scale, or a dogwood, beech, tulip, magnolia gets infested with scale insects, many times borers attack the trunks and subsequently damage the trunk and hinder the passage of food. Scales, borers and root problems are difficult to cure and most people are not willing to make the financial commitment necessary to treat them. Most of these problems could have been prevented with proper arboriculture.

Management should start when the trees are healthy. Once they're sick, the problems are compounded. For example, let's take a dogwood or an oak on the lawn. Scale insects fly onto the tree and begin to suck on a limb. The insect secretes a wax-like substance from its anus and covers itself with the protective substance. For us to get the scale now is like trying to get wet with a raincoat and umbrella during inclement weather. As the scale reproduces, the tree becomes weaker. Now it's borer time. Borers only attack trees that are weak or declining. Borers make tiny holes in the cambium, which can girdle the limb and open and expose tissue to infection of virus, disease or cankers.

The borers' holes in the trunk prevent the roots' stored nutrients from traveling up to the new leaves. Conversely, the leaves will not send nutrients back to the roots for storage. It is now the grass at the base of the tree that extracts most of the nutrients from the soil. Eventually, under climatic stress the leaves will wither and the arborist gets a call, asking "What's wrong with my tree?" Prevention is simple and inexpensive.

Identifying the insect. Curative treatment, however, requires knowledge. Before we do anything we must identify the problem or the insect. Does the client have wooly aphid or chermid? Elm *bark* or elm *leaf* beetle?

After identification, our next consideration is the life cycle of the insect we have identified (see first story in this issue). Does the insect overwinter in the bud scales, twig, petiole, bark, live wood, dead wood, leaf, soil or does the insect have an alternate host?

When does the insect lay its eggs and how many generations a year should we be looking for? When does the insect hatch or does it live as an adult over the winter? Look up the pupal and larval stages. That information tells us where and when to treat. Our homework is done. We know *what, when* and *where* but we still haven't decided *how*. Drench the soil, inject the root or trunk, spray, dust or do nothing and let the rains wash the enemy away? If we trust the birds, rains, or the natural balance of nature to do the job, most bankers would call our environment bankrupt.

when to call a professional

Although homeowners can control a variety of common insects with malathion and carbaryl, some are best

Color photos reprinted from *Insects That Feed on Trees and Shrubs* by Warren T. Johnson and Howard H. Lyon. © 1976 by Cornell University. Used by permission of Cornell University Press.

arborist?



photo by Steven Goldblatt

McFarland's crew spraying in March

controlled by professional arborists. These are tree scales, hemlock chermid, holly leaf miner, spruce gall, elm beetles, birch and dogwood borers, white pine weevil, boxwood pysillid, juniper tip midge, taxus and rhododendron weevils.

Today, the insects causing the most damage to our trees are:

Hemlock adelges *(Adelges tsugae)*, which looks like woolly aphid but is not an aphid. It belongs, however, to a family closely related to aphids. The insect sucks at the base of the hemlock needle. If not controlled, it will kill your hemlocks. The entire Wissahickon Valley is almost devoid of hemlocks because of this and scale. Most insecticides that control aphids, will not control the hemlock adelges. Penn State recommends diazinon applied in mid-May.

Hemlock scale. Two types of scale attack hemlocks, the Fiorinia and the Fletcher. We will, for this article, just call them scales because they are both controlled by dimethoate applied in mid-May and mid-July. Dimethoate is a systemic insecticide; when applied to the needles it is absorbed and kills the insects when they suck the juice from the needle. A contact insecticide won't be effective because the insect secretes a protective waxy substance with which it surrounds itself. The insect is only found on the underside of the needle. If not controlled, it will kill your hemlocks.

Oak scale (*Asterolecanium variolosum)*. There are many scales that attack oaks. However, the most serious in our experience is the pit-making scales. All oaks are susceptible but the pin oak is by far the most susceptible. The scales become so thick, layer upon layer, you have to take a pen knife to scrape them off to see the bark. The scale sucks the juice from the twigs and, after several years, the tips of the twigs die. If not treated, the entire tree will die. Once the tips start to die, the roots are so depleted, a major long-term program of lateral reducing, spraying and fertilizing is required to save the tree.

Around the time I was working on this manuscript, I toured the grounds of a commercial company with their grounds superintendent. I showed him, a knowledgeable man whom I respect, oak pit-making scale on one of his trees and he admitted he hadn't even noticed it. It's hard to see, and I would recommend if you own oaks, that you have them sprayed. Dormant oil is very important.

Magnolia scale *(Neolecanium cornuparvum)*. You'll have no problem identifying this one. It is the largest scale insect found in the United States. Principal hosts are *Magnolia stellata, M. acuminata, M. liliiflora,* and *M. soulangiana.* Serious infection usually kills the tree. Great amounts of honeydew are produced, and the sooty mold growing on the honeydew gives the plant an untidy look. The first molt occurs in May and the second in June. The nymphs secrete a wax over their bodies. I have trouble controlling this insect. Penn State recommends spraying in September with malathion or carbaryl because, by late August, most of the females have produced nymphs that are wandering around the twigs ready to start the life cycle over again.

Cooley spruce gall aphid *(Adelges cooleyi)*. The common name is misleading because the insect is not an aphid but an adelgid. The insect requires two years to complete its life cycle. The adelgid overwinters as an immature female on spruce. The female matures early in the spring to become a stem mother, and, then, lays several hundred eggs on lateral terminals. When the eggs hatch, the nymphs migrate to the new spring growth where they feed at the base of the growing needle. Their feeding induces a cell irritation that pro-

continued











A. Chlorotic appearance of upper needle surfaces where fiorinia hemlock scale populations are high.
B. Undersides of yellowed needles showing typical damage caused by female and immature scales.
C. Immature females developing on a new cone.
D. Old adult females, near the end of their egg production period.
E. Scale covers of males (seen at arrow 1) are white and small compared to the newly mature females (at arrow 2), which are ready to begin producing eggs.



A. Stem of a Japanese holly, *Ilex crenata,* with the pit-scale *Asterolecanium puteanum.*
B. Scales in typical pits on the bark of a holly.
C. *Asterolecanium puteanum* scale in an unusually deep pit.
D. A valley oak, *Quercus lobata,* with dead leaves and twigs resulting from attack by a west coast oak pit scale.
E. A heavy infestation of pit scale on an oak twig.
F. Golden oak scale, *Asterolecanium variolosum.* x 6.













A. An old eastern spruce gall and a mass of eggs at the base of a bud (note arrow).
B. Eastern spruce gall aphid egg masses at the base of an expanding Norway spruce bud.
C. The "cotton" pulled apart to show the black eggs, now about ready to hatch.
D. A Norway spruce twig. Note the several newly formed pineapple-shaped galls at the bases of the new twigs; these were caused by the eastern spruce gall aphid, *Adelges abietis*.
E. An eastern spruce gall on Norway spruce. Gall is about ready to open and release the young adelgids.
F. A new gall cut open to show the cells and the young adelgids inside.



A. American holly infested by the native holly leaf miner, *Phytomyza ilicicola.*
B. American holly leaves (see section D).
C,E. Japanese holly, *Ilex crenata,* leaves showing feeding punctures caused by one of the holly leaf miners.
D. American holly leaf showing early mines, and the feeding punctures made by the native holly leaf miner's ovipositor.
F,H. Lilac twig with leaves injured by the lilac leaf miner, *Gracillaria syringella.*
G. Privet twig with leaves injured by the lilac leaf miner.

duces a gall (cell mutation) which envelopes the young insects. By midsummer, an opening develops at the base of each needle on the gall. The adelgids inside migrate to the tips of the needles and transform into females with wings. These winged females then migrate to Douglas fir and a generation of woolly aphids is produced. No gall is produced on the Douglas fir.

Control to prevent galls on spruce trees is best achieved by spraying diazinon in early May and mid-September. We recommend including a miticide in the spray mix to also control the spruce mite, which causes other problems.

European elm bark beetles *(Scolytus multistriatus)*. This insect is responsible for carrying the fungus that kills our elm trees. As its name implies, it is a native of Europe. In the United States, it was first discovered in 1904 near Boston. Since that time, it has spread to most of the states.

The beetle overwinters as a full grown larva in the bark. The larva and pupa development is completed in spring and the adults emerge in early May. The adult feeds on young bark and usually selects the crotches on the elm twigs as their major feeding site. When the female is ready to lay eggs, she usually deposits them under the bark of a dead or dying elm tree. After going through the larva and pupa stages, the adult chews a hole through the bark and migrates to other elms to feed. Two or more generations occur each year.

The insect is controlled chemically or by cleaning, pruning dead wood from elms and burning or chipping the wood. If an elm is dying or dead, have it removed as soon as possible. Remove the bark from logs that you want to keep for firewood and also the bark around the stump, if it is not routed out. Remember the life cycle. The beetle lays its eggs between the bark and the hardwood, so remove the bark.

To control chemically we add eight gallons of 25% methoxychlor to 92 gallons of water and spray on tree in April. We repeat treatment once more in six weeks. The spray must saturate the bark as well as be applied to the small twig at the top of the tree. If one beetle carrying the disease chews on a tiny twig, that's the end of the elm tree.

Don't count on the new DuPont chemical, Lignasan (ethylmercury phosphate), to save your elms. Lignasan, if properly applied at a very early stage of infection, may arrest the fungus. Repeated injections are necessary and, after a couple of years, the injection borings may girdle the tree. Did your tree die from Dutch elm disease or from girdling by injection borings? Be careful when hiring a person to manage your elm trees. If you're worrying about dollars, don't worry about the tree. If you don't spend the money to save the tree, ask your arborist how much will it cost to remove the tree. Then ask yourself if you are also willing to wait 60 years for another tree to provide you with the beauty of your elm?

Holly leaf miner *(Phytomyza ilicicola)*. This leaf miner starts as a fly in the spring after a few new leaves have formed. Female flies must be about 10 days old before they begin to lay eggs in the leaf. After hatching from the eggs, the larva make slender narrow mines in the leaves. Later, the mine broadens into a long blotch. If heavily infected, the leaves drop and a second set of leaves may develop or the tree remains bare until the following spring. The native holly leaf miner overwinters as a larva or pupa in the leaf mine.

It is important, therefore, to rake and dispose of as many holly leaves as possible in the fall and early spring. Don't put leaves in the compost pile. To control chemically we suggest diazinon applied in early May and again in 10 days. *Prevention is a must.* For a cure, wait 12 months.

common problems

There are other insects that cause common problems: white pine aphid, bagworm, tent caterpillar, borer, aphid, mites, Japanese beetle, etc. If, however, you can find a correlation between the life cycle of the above insects and when to treat as directed, you will be able to understand the professional system.

The system, simply stated, is to prevent at the early stage of insect development. The larva or pupa stage is ideal. The life cycle of most common insects is very well illustrated in a new book called, *Insects That Feed on Trees and Shrubs* by Warren T. Johnson and Howard H. Lyon. (Comstock Publishing Associates, a division of Cornell University Press, 1976. Available through PHS Library.) Whether you are an organic or chemical gardener, that book will help you understand a large portion of pests in the environment. (Color plates accompanying this article are reproduced from the books.)

Now for the chemical gardener with the *common sense* to first read the entire label, we suggest Penn State University's publication entitled *Pest Control Suggestions.* This publication is offered, at no charge, through your Pennsylvania State University County Extension Agent.

While professional arborists are not entomologists, we know how to find answers and to recommend a method of treating your problem in a manner that is environmentally acceptable.

TIME	INSECT	MATERIAL TO USE
March	Scale: oak, azalea, euonymus, cotoneaster and others	"Superior" oil
April	Elm bark beetle	25% Methoxychlor
May	Lace wing	Malathion
	Aphids	Malathion
	Leaf miner	Malathion
	Tent caterpillars	Methoxychlor
	Cankerworms	Methoxychlor
	Hemlock chermid	Diazinon
	Spruce mite	Dicofol
June	Aphids	Malathion
	Lace wing	Malathion
	Pine bark aphid	Malathion
	Dogwood borer	Lindane
	Rhododendron borer	Lindane
	Bagworms	Carbaryl
	Leaf beetles	Carbaryl
	Leaf miner	Dimethoate
July	Leaf miner	Dimethoate
	Douglas fir aphid	Dimethoate
	Hemlock scales	Dimethoate
	Hemlock chermid	Diazinon
	Bagworms	Carbaryl
	Leaf beetles	Carbaryl
Sept.	Spruce mites	Dicofol
	Spruce gall aphids	Carbaryl
	Tulip scale	Malathion
	Aphids	Malathion

We have used common names of pesticides on this list. Check list on page 12 for brand names.

PREVENTING DISEASE OF WOODY ORNAMENTALS

by Lester P. Nichols

We should start working in the spring to prevent diseases of woody ornamentals. Such a program would include sanitation, improving the growth of the plants, planting disease-resistant varieties, and spraying.

Sanitation means pruning weak or diseased twigs or branches, and raking and composting all fallen leaves from such plants as flowering crabapples, hawthorns, and roses. These measures will keep fungi that overwinter in the leaves from spreading.

Fertilizing trees and shrubs in the spring that have been previously weakened by disease will improve their growth and make them less susceptible to disease. That is especially true of red and Austrian pines and boxwood. Improving the drainage around established plants and making sure that newly planted specimens have adequate drainage will reduce losses to azalea and rhododendron from fungus wilt diseases and will reduce the damage yew and dogwood suffer when grown in excessively wet locations. There are too few disease-resistant woody ornamentals available but those that are, such as flowering crabapples, pyracantha and hawthorn, should be used in new plantings to phase out the susceptible plants now being grown.

Fungicide sprays for woody ornamentals are limited by the Environmental Protection Agency, but those that are available will give excellent protection against certain diseases. Remember fungicides are most effective when used according to the label directions, which give the best time, manner and rate of application.

Here are some of the more common disease problems among the woody ornamentals:

AZALEA

Leaf and Flower Gall: An airborne fungus that overwinters in the buds causes azalea leaves and flowers to thicken into fleshy, bladder-like, pale green and then pinkish-white galls (Fig. 1). As the galls mature, they turn brown and hard.

Prevention: If the galls are not too numerous pick them off and destroy them before they take on the pinkish-white color. This will reduce the number of fungus spores present to infect the following year's buds. Zineb 75% wettable powder (1-1/3 tablespoons per gallon) applied before the flower buds open in the spring will reduce the infection.



Fig. 1. Azalea, leaf and flower gall

Petal Blight: An airborne fungus that overwinters on the soil beneath the plants. It causes petal spotting. After the spotting the flowers collapse, turn brown, and may be rather slimy. They remain hanging on the plants long after unaffected flowers have died and fallen off. An outbreak of the disease during wet, humid weather may kill practically all the flowers on a plant.

Prevention: Mist spray the flowers just as the buds are opening and again when 70% of the blossoms are open. Use either benomyl 50% or zineb 75% wettable powders following the label recommendation as to rate.

RHODODENDRON

Non-parasitic Leaf Spots: Brown spots on the foliage often result from sunscald, drought, or winter injury. This spring following the severe winter's injury to the leaves, the leaf spots were numerous. They appear as a pattern of somewhat circular areas around the edges or on the tips of leaves, or as long dead areas on either side of the middle vein (Fig. 2). A weak airborne parasite enters the plant through injured tissue, and causes silver-gray spots on the upper leaf surface and light-brown spots on the lower leaf surface. The

continued

upper leaf surface may be thickly dotted with black fruiting bodies of the fungus.

Prevention: Since the fungi causing the leaf spots are non-parasitic and are growing on leaf tissue that has been injured, they will not spread to the new leaves when they emerge. Fertilize and water the plants to encourage strong new growth. Next fall mulch and provide windbreaks for the plants to avoid a recurrence of the winter injury.

BOXWOOD

Decline, Dieback: Decline or dieback often follows winter injury or occurs on plants that are growing in a poorly-drained soil. In the spring, the foliage of affected plants changes from the normal dark green to gray-green or bronze and finally to a straw color. Shoot growth is weak and old leaves drop prematurely (Fig. 3). Entire branches die, especially those in the middle or top of the plant. Sunken areas or cankers may occur in the bark of the trunk just above the ground line or on the branches in the crotches where dead leaves and debris accumulate. The bark on the sunken areas may be brown, or streaked with brown, and may peel or split away from the gray to black discolored wood beneath.

Prevention: In the spring before growth starts, remove leaves and debris lodged in crotches. Remove affected branches by cutting back several inches below cankers. On large branches, remove small cankers by cutting back to healthy wood on all sides. Shape wound to a point at either end. Spray before growth starts, when new growth is about half completed, after spring growth is complete, and after fall growth is complete. Use liquid lime sulfur, one pint to six gallons of water.

FIRETHORN

Scab: Dark, velvety sooty areas appear on the leaves that turn yellow, then brown, and drop prematurely. The fungus infects the berries, spoiling their appearance with a black, sooty, scab-like discoloration that may spread over half or more of the berry surface (Fig. 4). Affected berries are often badly shriveled. The Laland firethorn, *Pyracantha coccinea* 'Lalandei,' is susceptible to this disease while *P.* cv. Mojave is resistant.

Prevention: Spray three times at weekly intervals as soon as the new growth appears with either folpet (Phaltan) 75% or benomyl 50% wettable powders at the rate given on the label.

FLOWERING CRABAPPLE

Scab: The fungus infects leaves, causing dull, smoky areas, which change to olive green moldy spots without definite margins (Fig. 5). The leaves may turn yellow and fall prematurely. On fruit the spots are small, round, dark-olive areas which, as they increase in size, become corky in the center.

The fungus overwinters in fallen leaves and in twig cankers. During spring rains, spores are ejected from fruiting bodies in old leaves and are carried by air currents to infect newly opened leaves.

Prevention: With the usual amount of rainfall in April and May, scab can be moderate on susceptible varieties; with heavy rains it can be severe. As soon as one-half inch of green leaf shows on the flower buds, spray weekly with folpet (1½ tablespoons per gallon of water) or benomyl (½ tablespoon per gallon of water) to avoid scab infections. The number of sprays necessary will depend on the amount of rain we



Fig. 2. Rhododendron, non-parasitic leaf spots



Fig. 3. Boxwood, decline-dieback



Fig. 4. Pyracantha scab

get from the end of April through June. Anywhere from three to 10 sprays may be needed. Of course the best way to avoid scab infections is to phase out the susceptible varieties such as Hopa, Eleyi, Strathmore, and Almey and replace them with some of the disease-resistant crabapples such as Adams, Beverly, Candied Apple, David, Dolgo, Donald Wyman, Japanese, Mary Potter, Profusion, Red Splendor, Sargeant, Redbud, Snowdrift and White Angel.

HAWTHORN

Leaf Spot: A fungus that overwinters on old fallen diseased leaves and in twig and branch cankers causes small, angular reddish-brown spots on leaves (Fig. 6). Infected leaves turn yellow and fall. Severely infected trees may lose nearly all their leaves. The English hawthorn, *Crataegus oxyacantha,* and Paul's scarlet hawthorn, *C. oxyacantha pauli,* are susceptible to this disease. The cultivar Toba is resistant.



Fig. 5. Flowering crab scab

Control: As soon as new leaves have unfolded in spring, spray two or three times at 10-day intervals with zineb 75% wettable powder (1-1/3 tablespoons per gallon of water). During wet seasons additional applications may be necessary.

MOUNTAIN LAUREL

Leaf Spot: A fungus infects the leaves causing irregular, circular, grayish-white or silvery spots with a red to purple border (Fig. 7). If the disease is severe, leaves may fall. The disease usually is most severe when the shrubs are crowded or partly shaded and when spring rains are heavier than normal.

Prevention: If infection is light pick off and destroy affected leaves before new growth appears. To prevent infection of this year's leaves spray with ferbam 76% wettable powder (1½ tablespoons per gallon) starting at bud break, 10 days later, and again 10 days later.

PACHYSANDRA

Leaf and Stem Blight: A fungus that overwinters in the crowns of affected plants and causes large brown to black areas on the leaves and stems. Pink spore masses are formed on these affected spots during wet weather. The disease is likely to be severe on crowded plants or in locations where the plants have been covered with heavy snow. The disease may spread rapidly on plants injured by scale insects.



Fig. 6. Hawthorn leaf spot

Prevention: Thin plants periodically to avoid dense growth. Remove severely diseased plants. Control scale insects. When new growth starts in the spring, spray two or three times at weekly intervals with mancozeb 80% wettable powder (maneb plus zinc) at the rate of 1½ tablespoons per gallon of water.

PINE

Diplodia Tip Blight: Dead needles and twigs at the tips of living pine branches are common symptoms of diplodia tip blight on red and Austrian pines.

A few brown needles in the current season's growth, usually on lower branches, are the first indications of the disease. Adjacent needles are killed as the fungus spreads within the twig. Needles killed during elongation appear stunted and straw-colored. All needles developing on an infected twig during the current year are usually killed. The death of a terminal shoot stimulates the proliferation of lateral shoots, which also eventually become blighted. Severe infections year after year may greatly weaken or even kill large trees. The unsightliness of a severely infected

continued



Fig. 7. Mountain laurel leaf spot

tree is usually cause for removal before the tree dies.

Prevention: This disease is most severe on old or weakened trees. The fungus easily infects trees growing in dense plantings or dense shade and in shaded or shallow soil that is extremely wet or dry, or deficient in nutrients. Trees injured by frost, insects, hail, poor planting or pruning techniques, gnawing mammals, or cold winds are also especially susceptible. Species planted outside their natural geographic ranges, such as the red and Austrian pines in Pennsylvania, are more severely blighted than native species. Valued trees should be kept vigorous by fertilizing, watering during dry periods, and controlling insect pests. These practices increase the resistance of pines to diplodia tip blight.

When only a few branches show symptoms, pruning and sanitation are useful control measures. Prune blighted parts just below the youngest live branch whorl. Since fungal spores can be transported to healthy tissue during pruning, prune only when the tree is dry. The pruning tools should be disinfested before each cut by dipping them into a solution of alcohol or household bleach. All blighted needles, twigs, cones, and debris from the tree and the ground beneath the tree should be burned or buried.

ROSE

Black Spot: This is the most serious and damaging disease of outdoor roses. The disease appears on the leaves as circular black spots up to ½ in. in diameter. The spots have a feathery margin surrounded by a zone of yellow tissue (Fig. 8). Infected leaves become yellow and fall prematurely. Severely affected plants may be almost defoliated. The loss of foliage weakens the plants, reduces growth and leaves them more susceptible to winter injury.

Prevention: In the spring carefully rake up and compost all fallen rose leaves. Prune drastically to within 4 to 6 in. of the soil to reduce the amount of fungus present. Although this procedure reduces early flowers, total yield will be satisfactory. Plant roses in an area with good soil drainage and ventilation. Avoid shade spots among dense plants.

Severely affected varieties can be discarded to increase the effectiveness of control procedures for the more tolerant ones. By grouping the more susceptible teas, hybrid teas, and hybrid perpetuals, spraying will be facilitated.



Fig. 8. Rose black spot

Spray applications are more effective than dusts. Effective materials are chlorothalonil or folpet 75% wettable powder or maneb with zinc 80% wettable powder. Follow label recommendations for amounts. Begin applications when the first leaves are ½ in. long, and repeat at weekly intervals throughout the season. Direct the spray so that both surfaces of the leaves are covered. The degree of black spot control will be no better than the coverage obtained. Later in the season when powdery mildew starts to appear add benomyl to any of the above fungicides.

Unchecked, plant diseases can ruin the attractive appearance of your favorite trees and shrubs or even kill specimens you worked so hard to establish in your garden. The key to the well being of your ornamentals is a preventive program. Do not ignore the diseases; they will not go away. Use the information you have, and you can prevent them from recurring another year.

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Professor Lester P. Nichols is a plant disease specialist in the Extension Service of The Pennsylvania State University. He works with ornamental plants including commercial greenhouse crops, commercial nursery crops, and shade trees. He has a special interest in the disease resistance of flowering crabapples.

The Horticultural Weeder's Digest



Hairy crabgrass

by Barbara Hesse Emerson

The concept of weeds is ironic, because while we fight them, they are particularly adapted to thrive with humans and human ways. As W. T. Stearn wrote, "Taken as a whole, weeds are not so much a botanical as a human psychological category within the plant kingdom, for a weed is simply a plant which in a particular place at a particular time arouses human dislike and attempts are made at its eradication or control." Most of us are so accustomed to seeing weeds that we take them for granted and don't realize the considerable impact these non-legged pests have on our lives.

A 10-year government survey published in 1954 showed an annual loss of nearly $4 billion to weeds in agricultural land. That was nearly as large as the combined losses to insects and diseases, and of course the figures would be considerably greater today. Although we may not recognize the cost directly, its price is part of what we pay for food and clothing or other natural fiber materials. Additional losses not considered in this survey include such aspects as safety hazards in industrial sites and along highways, clogged waterways, land value depreciation because of noxious weed infestation (more serious in the North Central and Western states than here in the Northeast), decreased enjoyment of recreational areas, and garlic-flavored milk.

In our gardens, lawns, and similar home situations, we are all aware of weeds. They are aesthetically or horticulturally annoying, prick our pride, and diminish our pleasure. Even here, the full impact of their presence may not be obvious. Most of the experiments showing vividly the strong competition of weeds for available nutrients have been done by agricultural research workers on field crops, but their findings give a fair indication of what weeds do in home plantings. As an example, a wild mustard plant *(Brassica kaber* var. *pinnatifida)* can be expected to absorb twice as much nitrogren and phosphorus, and about four times as much potassium as a well-developed oat



plant *(Avena sativa)*. The average common ragweed *(Ambrosia artemisiifolia)* plant requires three times as much water as a corn plant *(Zea mays)*.

Competition for nutrients produces off-color foliage and retards growth, flowering, or fruiting of the less efficient ornamentals, fruits, or grasses we are trying to produce. Annual weeds, for instance, are known to depress pea *(Pisum sativum)* yields from 10% to 100%, depending on the weed population density. Especially with root crops, can weeds cause deformity as they compete for space, as well as for nutrients and water. Parasitic weeds, such as the dodder *(Cuscuta* spp.*)* that occasionally infests English ivy *(Hedera helix)*, absorb food directly from the host.

In addition to such competition below ground, the expanding aboveground parts of weeds smother desirable plants from seed that is slower to germinate or slow to develop after germination, and can overwhelm established plants. Common chickweed *(Stellaria media)* and henbit *(Lamium amplexicaule)* in coldframes are examples of this damage. Chickweed and crabgrass *(Digitaria ischaemum* and *D. sanguinalis)* do the same thing in new or established lawns. Other smotherers are the bindweeds *(Convolvulus arvensis* and *C. sepium)* that twine their way over any plant within reach of their tendrils, and bishops goutweed *(Aegopodium podograria)*, which often invades shaded or woodland borders so completely that no other herbaceous plant can persist. The same thing is true of mugwort or chrysanthemum weed *(Artemisia vulgaris)*, increasingly widespread in Delaware Valley nurseries and gardens, and of a seemingly-delicate rock garden escapee covering more and more lawns, *Veronica filiformis*.

The struggle for light is important in determining the dominance of a plant, and this factor, too, helps aggressive weeds overpower more desirable but less competitive plants. In addition, products of plant metabolism may inhibit germination of seed or retard the growth of established plants. Quackgrass *(Agropyron repens)* is notorious for the inhibitory effect of an exudate from its roots. This effect is further complicated by some nitrogen depletion as dead quackgrass rhizomes are decomposed, causing chlorosis and crop

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Weeder's Digest continued

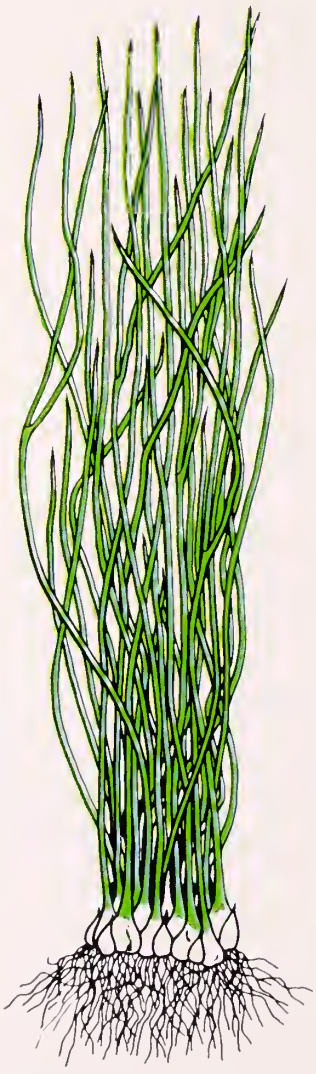
stunting. There is evidence that wood-sorrel *(Oxalis* spp.*)* roots may excrete oxalic acid, and other instances of antagonistic action are known.

hosts and killers

Weeds can harbor or act as hosts for damaging insects and fungal or bacterial diseases. Purslane *(Portulaca oleracea)* can be infected with the root-rot fungus *Rhizoctonia* but without apparent disease symptoms. A number of cruciferous weeds are believed to be hosts of the club-root disease of cabbage *(Brassica oleracea* var. *capitata)* and related vegetable crop plants, and the bacteria that cause bean blight live on some wild legumes. Aster yellows, spread by the six-spotted leafhopper, is common on several wild hosts, especially common plantain *(Plantago* spp.*)*. Jimsonweed *(Datura stramonium)* is host to red spiders, flea beetles, and other insects. Several weeds, including ground cherries *(Physalis* spp.*)* are hosts for cucumber and tomato mosaic, and cinquefoils *(Potentilla* spp.*)* can harbor strawberry leafspot. Many ornamental plants are undoubtedly victims of similar communal activity.

Although impossible to evaluate on a dollar basis, the cost of labor, equipment, and especially of precious time spent to control weeds is familiar to every gardener. So are the effects of weeds with physically irritating characteristics. Hayfever sufferers know well their allergic response to the large quantities of light pollen produced by ragweeds, sweet vernalgrass *(Anthoxanthum odoratum),* and others. And what Delaware Valley resident isn't aware of the distressing inflamation toxic poison ivy *(Rhus toxicodendron)* oils can produce! Far less frequent, but fatal, are the human deaths that result from eating horsenettle *(Solanum carolinense)* berries or jimsonweed seeds. Seeds, leaves, and roots of several other weeds can also cause poisoning. Pokeweed *(Phytolacca americana)* roots are among the latter, and so are Star-of-Bethlehem *(Ornithogalum umbellatum)* bulbs. Livestock, too, can get into trouble with weeds, and more than one horse has died of the hydrocyanic acid in wild cherry leaves *(Prunus serotina).*





Wild garlic

In spite of their many distressing characteristics, weeds are not without merit. Whole books have been written on their beneficial qualities. Consider the paradox of nutsedge *(Cyperus esculentus)* whose tubers are a food, but whose appalling invasiveness has made it the world's No. 1 plant pest. Or of dandelions *(Taraxacum officinale).* Their leaves provide welcome spring greens, and their pretty flowers are the base for a wine. At the same time, their ground-hugging leaves smother smaller plants, and their roots compete with those of turf or crops. Some nurserymen regard chickweed as a desirable ground cover to prevent winter soil erosion. Last summer, my husband was amused to sell to health-food stores one of the most common weeds of all — purslane, or pusley. Originally brought to America as a potherb, it blankets our gardens with its water-hungry stems and leaves. Honeysuckle *(Lonicera japonica),* now destroying the beauty of many woodland areas, was prized for its own beauty when it was introduced to this country a little over 100 years ago. And many a weed is a flower-arranger's joy.

controls

There are several ways to control these plants when they are unwanted. The choice depends on both the horticultural situation and the life history and growth requirements of the weed. The oldest and simplest, although the most time-consuming, is pulling. It is usually the most practical way to remove weeds in flats or similar restricting containers, young weeds from among desirable seedlings growing close to each other, and weeds growing right in with shrubs or clumps of perennials. The smaller the weeds, the more easily they are removed, of course, and the less harm they can do. If the soil is moist and the root area is held down with one hand while the weed is twisted out with two or three tentative tugs instead of one mighty yank, larger ones can be eliminated with a minimum of root disturbance to the desirable plants.



Broadleaf plantain



Common cinquefoil

Since ancient times, cultivation has been the most widely used form of weed control, whether with a stick, a hoe, a wheel cultivator, or a powered rototiller. Again, it is done to best advantage when weeds are still small. Whether working with plants in rows or spaced informally, cultivation should be only an inch or less deep, to slice off the weeds without disturbing roots of the desirable plants. If you do it when the soil is dry, you are less tempted to cultivate too deeply. Cultivation should be repeated frequently, whenever germinating weeds are an inch or two tall, so they never have a chance to develop extensive root systems. This method will also control newly-germinated weed seedlings even before they appear above ground.

When ground is prepared for a new garden, roots of any perennial weeds should have been eliminated by thorough digging and hand removal, or by the most recent weed control technique, chemically. If sprouts from any remaining bits of root, such as from Canada thistle *(Cirsium arvense)* or horsenettle are consistently chopped off as soon as they appear above ground, they will eventually become discouraged when the food reserves in their roots are exhausted. It may take two or more years, and there can be no let-up. Otherwise, the whole process will have to be started again because the tops will have been able to replenish reserves in the roots.

Another highly commendable way of controlling weeds mechanically is mulching. You maintain a layer of relatively stable material over the garden area so that weeds emerging from the soil are deprived of light and thus are unable to grow. (Before the mulch is applied, existing weeds should be cleared away.) Mulching has additional important advantages. It conserves moisture by retarding evaporation, helps maintain more nearly uniform soil temperatures, and ultimately improves soil texture. Once in place, little more effort is needed for the rest of the garden season.

The choice of mulching material from among the many available will depend on where it is to be used and the individual characteristics of the material. Each one has advantages and disadvantages. Several general gardening books discuss them in fair detail. The mulch must be thick enough to discourage weeds, but not so thick that it interferes with the desirable plants' root functioning. Pebbles would be appropriate for paths or permanent patio plantings, but not in a garden. For weed control in ornamental gardens, such materials as buckwheat hulls, ground bark, and peat moss are attractive. Wood chips are useful for shrub borders, and under plants requiring acid soil, such as rhododendrons *(Rhododendron* spp.*)* and blueberries *(Vaccinium corymbosum),* pine needles and oak leaves are particularly good. In vegetable gardens, less attractive but effective materials like straw, ground corn cobs or peanut hulls, and black polyethylene film can provide the many benefits of mulching, including some reduction of insect or disease incidence. One ingenious local gardener uses with great success strips of worn-out carpet from a Goodwill shop!

lawns

Lawns, another concern of gardeners, can be neithter cultivated nor mulched. Weed pulling and digging is of doubtful value even if one is inclined to spend the time required. True, there can be a satisfaction in knifing a plant adversary, but to the weed may go the final victory. Cut off a dandelion, and three new crowns can sprout from the stump. Dig out a clump of garlic *(Allium vineale)* and more tops will appear from bulblets left behind. Overlook a sprig of nimblewill *(Muhlenbergia schreberi)* and a patch will soon be reestablished.

The range of weeds infesting lawns is restricted to those able to tolerate continual mowing. Fortunately, the majority of these are susceptible to treatment with selective herbicides, which aremighty handy chemical tools. Those most widely used are the substituted phenoxy compounds (2,4-D, 2,4-DP, MCPP, and silvex), and dicamba. Different mixtures of these are marketed for once-over control of a broad spec-

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Weeder's Digest continued



Muhlenbergia or Nimblewill

trum of weeds. Some are offered in granular form and some are liquid. The granulars are somewhat easier to apply, but the liquids work more quickly and are usually more efficient and economical. When used according to the directions their manufacturers have registered with the U.S. Environmental Protection Agency (EPA), they can eliminate most dicotyledonous "broadleaf" weeds without destroying the monocotyledonous grasses. Research continues on weeds such as nutsedge, bishops goutweed, and veronica that are difficult to kill selectively with current herbicides.

Timing the herbicide application properly is important, since certain weeds respond differently at different times of year or stages of their growth cycle. Those growing best in cool weather, such as chickweed and garlic, are best treated in late fall or early spring. Dandelions are most conspicuous in spring, but are more readily controlled by summer or early fall treatment, when food movement is predominantly downward. Plantains *(Plantago lanceolata, P. major,* and *P. rugeli)* respond almost any time of year. Since the weed response is a metabolic one, rather than contact as with salt or oil, the speed with which results appear depends largely on how fast the weed is growing. It is the metabolic aspect that also makes accurate application so important. Unlike insecticides or fungicides, herbicide treatment rates are based on a ratio between active ingredient and area covered, rather than concentration of the solution itself. Any deviation can alter weed response, since these compounds are plant growth regulators. For the same reason, care must be taken to apply the sprays uniformly. Drift of spray particles to sensitive desirable plants must always be avoided.

Maintaining thick healthy grass through proper fertilization, mowing, and disease or insect control is essential to long-term turf weed control. In fact, the presence of certain weeds indicates poor cultural conditions to be corrected. Prostrate knotweed *(Polygonum aviculara)* and goosegrass *(Eleusine indica)* are most frequently found in compacted soil, such as that of play areas or along paths and driveways, which needs aerification. Liming soil where wood sorrels and sheep sorrel *(Rumex acetosella)* grow helps discourage these acid-lovers. Cinquefoils, prostrate spurge *(Euphorbia supina)* and excessive amounts of crabgrass show a need for better fertility.

The best chemical crabgrass treatment is a preventive one. Apply a preemergence crabgrass herbicide in early to mid-April, before crabgrass seedlings start to emerge. DCPA is the most common one. It kills germinating seed for most of the growing season so the lawn grasses can grow without competition and interrupts a continual cycle of crabgrass in summer, chickweed in fall and spring, for example. If this treatment is missed and crabgrass appears, it can be killed with repeated applications of DSMA or other methanearsonate. Undesirable perennial grasses cannot be eliminated selectively with chemicals. They require spot treatment with a nonselective herbicide, or physical removal.

fruits, vegetables and flowers

Chemical weed control for vegetables, fruits, and flowers is complicated by the fact that comparatively small numbers of a large variety of plants are grown in home gardens. Several herbicides are registered with EPA for use in large commercial plantings of specific crops, but are available only in bulk agricultural quantities. A few exceptions to this are chloramben, DCPA, diphenamid, and trifluralin, all preemergence type herbicides for application to clean-cultivated soil. They suppress weed seed germination for several weeks after application, the most important period as far as competition is concerned. Each product's label carries a list of the desirable plants with which it may be used, and the weeds it controls.

There are also a few nonselective herbicides that can be used with *great caution* for spot treatment in ornamental plantings. These include amitrole and paraquat. Amitrole interferes with the formation of chlorophyll, and any new foliage of plants it touches is white. It is a grass killer (desirable as well as weedy) and is especially effective on poison ivy, Canada thistle, milkweed *(Asclepias syriaca),* mugwort, and quackgrass. Paraquat, a contact herbicide, does not move into the roots. It is useful where portions above ground are to be killed back.

All of these compounds are regulated by law. They may be used only as approved by EPA. It is illegal to recommend or use them in any other manner. Applied properly, they offer a degree of weed control that can be accomplished in no other way.

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Turfgrass Chemical Weed Control Recommendations is a leaflet available from Pennsylvania State University's Cooperative Extension Services in each county.

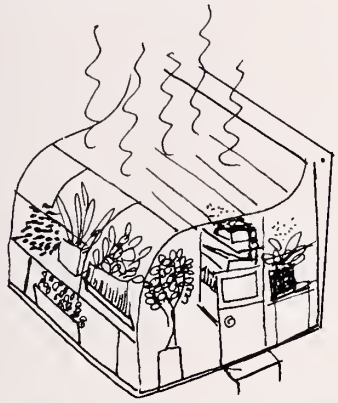
Barbara Emerson is technical information coordinator for the Agricultural Division, Amchem Products, Inc., in Ambler. She has contributed articles on weed control to the *New York Times,* other periodicals, and *Reader's Digest Complete Book of the Garden.* She practices a good deal of what she preaches.

home remedies

stink bombs for everything

Of all the home remedies people told us about, we found this one to be the most inventive; its inventor, Judy Oruska of Blackwood, strongly asserts its efficacy. Here's her telephone description of the stink bomb.

"I take as many dried chili peppers as I have on hand, add six or seven green onions (scallions) and a whole bud of garlic. I chop them up and add water, put into the blender and liquefy. I put the liquid into a disposable jar and let sit covered for 24 hours in the refrigerator. I strain, dilute with water to bring the total quantity to a full gallon and put in a sprayer.



"I can kill any pest in the greenhouse with the spray. We may miss 5 per cent because they're at the stage of development where they won't be affected, but generally it gets even the larvae. We had given up on the dwarf citrus, which had been infested with whitefly, but the spray brought it under control. The odor in the greenhouse disappears within 24 hours. I wear a mask when I'm spraying, mainly because the peppers make it hard to breathe at all.

"I also spray the roses in the garden with the mess and it controls the aphids. As an active growing control in our vegetable garden, we plant cayenne pepper plants among the other vegetables and they work well with many pests, including Japanese beetle. We also grow them among our celosia."

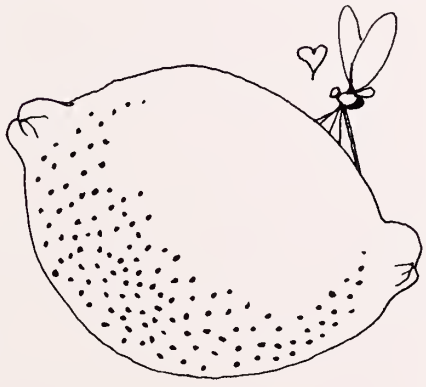
Judy and John Oruska exhibited for the first time anywhere in the 1977 Philadelphia Flower & Garden Show and walked off with a "best of day" for their cyclamen. They must be doing something right.

sticky yellow cards for trapping the greenhouse whitefly

Ralph E. Webb is a research entomologist at the Ornamentals Laboratory at Beltsville Agricultural Research Center in Beltsville, Maryland. He reports:

"In tests at the Beltsville Agricultural Research Center, I've trapped large numbers of whiteflies using sticky yellow cards. The procedure had been reported earlier by James Kring of the Connecticut Agricultural Center.

"I use one foot square cards (the larger the better); a thick cardboard prevents warping. They are mounted on a 12 in. wooden potting label or stake and then painted. I use Rust-Oleum 659 Yellow. Other yellows might be as attractive or even more so. After the paint is dry I apply the sticky material, Tack Trap, made by Animal Repellents, Inc. (Griffin, Georgia). I've tried other sticky materials but after a day or so they seem to form a thin surface layer

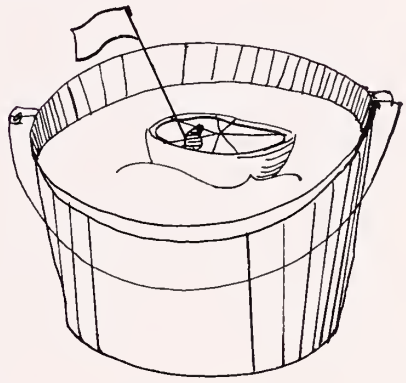


that allows the minute whitefly to bounce right off. Tack Trap, on the other hand, remains effective for weeks. Both sides of the cards can be painted for maximum effectiveness.

"The cards should be placed in the greenhouse at 6 to 10 ft. intervals. Adult whiteflies are attracted to these cards from several feet away; if you shake neighboring plants that are infested, they will fly to the cards like iron filings to a magnet. While this technique is impractical for a large commercial greenhouse, it can control populations in small greenhouses and protect those plants not yet infested."

slugs

Irena Uknalis of Philadelphia wrote telling us that in London last year she noted a small garden dotted with half-sections of grapefruits turned upside down. When she asked about them she was told that they drew slugs. The gardener dropped the grapefruit halves with slugs into a bucket of water to drown them and found it altogether a satisfactory method of getting rid of them.



simple test for nematodes

Ed Lindemann, our "hotline" horticulturist tells us he receives many calls from people who want to find a way to determine the presence of nematodes in their soil. Here's a method developed by Patrick Miller, a plant pathologist at the Connecticut agricultural experiment station. The method, published in the *Florists' Review,* uses radishes as indicators of the presence of nematodes in soil samples.

Miller uses a composite sample of about four cups of soil from several points in a vegetable garden. The soil must come from the root zone which is three inches below the surface.

continued

home remedies

continued

After the soil is mixed together, it is placed in four small pots. Two are placed in a freezer, or the freezing section of a refrigerator, for 48 to 72 hours —to kill any nematodes present— and two are left untreated. The soil must be moist but not wet.

Next, radish seeds are planted in each of the pots, which are placed on a windowsill or in a location suitable for seed germination (radishes are used because of their quick germination and susceptibility to nematodes).

After six days, Miller says, if growth is the same in the soil that has been frozen as in the untreated soil, chances are there is no nematode problem. If growth is better in the soil that has been frozen, there probably is a nematode problem.

Should the nematode test be positive, the plant-stunting effect can be countered by adding organic matter, such as leaf mold or grass clippings, to the garden soil. If a weed killer has been used on grass, the clippings should not be used because of possible residual effects.

A similar test can be run with soil in which grass is to be planted. The soil should come from the top three inches and be treated in the same way as mentioned. If the grass grows better in the frozen soil, nematode damage to the lawn is likely.



getting rid of the cabbage worm

Libby J. Goldstein, coordinator of the Pennsylvania State University Cooperative Extension Service's Urban Gardening Program in Philadelphia, says, "Every article on comparison planting I have ever read asserts that hyssop *(Hyssopus officinalis)* deters the imported cabbage worm, which is really butterfly's larvae. Accordingly, for the past two years I have planted hyssop among my cabbages (in the two Community Vegetable Gardens operated by the Queen Village Neighbors Association). The hyssop strategy did not work at all. Indeed, the cabbage butterflies used the hyssop flowers as a nectary all during their blooming season. Interplanting dill *(Anethum graveolens)* and sage *(Salvia officinalis)* in the cabbage patch also appeared ineffective.



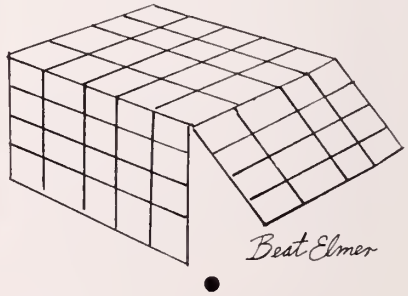
"All was not lost, however; I found something that does work. I learned it from some old Southern gardeners who work on our community garden. Just sprinkle the plants with lime in the early morning. The worms virtually disappear. Apparently, the lime dehydrates the worm as salt does a slug. In fact, salt or salt water is also recommended by the old-time gardeners on the garden and also works — if you put it right on the worm. Just don't get too much salt on the soil.

"Some of the older gardeners recommended a squirt of tobacco juice or some snuff for aphids. Not being a chewer or sniffer, I soaked some cigarette butts in a pint of water, diluted the solution to about one tablespoon/quart and sprayed the solution on my roses and nasturtiums. It worked on them but was ineffective on the apple tree. I think a less diluted solution might be more effective."

lime or camphor for rabbits, a cage for strawberries

We asked Martha Garra if she used any home remedies in her garden. After reviewing her list of steady commercial products, she said no, but she reminisced about Mr. Andrews, head of the fruit and vegetable department at the Pennsylvania School of Horticulture for Women more than 30 years ago. She said he tried out an idea during World War II when pesticides were in short supply and a good harvest was important. To protect seedlings of beans, cabbage, broccoli, peas and lettuce from the depradations of rabbits, he suggested a light sprinkling of lime on the early green growth. He often distributed it by folding cheese cloth in two, placing a couple of tablespoons full of lime in the middle and sifting the lime through as he walked up and down the aisles. George and Joanna Reed of Malvern report they keep the rabbits out of the vegetable patch by strewing mothballs in between the rows of vegetables when the first tender bits of green appear.

Although Martha Garra has not yet found a solution to the rodents that have decimated her shrubs, her peonies and altogether played havoc with her garden over the last few years, she says that her "Beat Elmer" keeps birds away from young strawberries. The Beat Elmer is a wire contraption that can also be used for forcing plants if covered with polyethylene. Don't use the polyethylene, though, when protecting strawberries because the bees won't be able to pollinate them. If you want a description for making a Beat Elmer, send 20 cents and your address to Green Scene and we'll send you one.



Wittie helps commended of the ancients for garden pests

by Mary Lou Wolfe

Gather up worms and snails after evening showers; continue this after all summer rains; continue your hostility against vermine; encourage the breeding of bats.



These words come from a tiny calf-bound book, worn, marked, and almost falling apart, containing John Evelyn's 1699 instructions for English gardeners. The notations, signatures and bookplates show that it was studied by several generations of gardeners and book lovers before finding its way into the PHS collection. Evelyn's *Gard'ner's Almanac,* and others published before and after, gave practical advice in everyday language meant to be read by the person who got the calluses. No folio editions or handsome plates, these are modest books, the size of today's paperback, illustrated with a few instructive diagrams and woodcuts. John Mortimer, one of these practical writers, says in his 1716 *Whole Art of Husbandry,* "I have endeavoured, throughout the whole Book, to express myself in as few Words and plain a Stile as I could, for the Benefit of Vulgar Readers, the culture of Lands being left almost intirely *[sic]* to their management."

Vulgar readers (those reading English, not Latin) faced and recognized the same threats to successful gardening that plague us today: pests and diseases. Diseases described were "smuttiness," "blites," and "mil-dews"; pests other than weeds, were termed "vermin," a handy label for anything considered noxious, mischievous or disgusting, from slug to toad or mole to man.

As you read the "Wittie helps commended of the ancients," you'll chuckle at some but will recognize in others direct forerunners of remedies still, or until very recently, in use. Earlier gardeners in their battles against pests and disease waged war on various fronts: chemical, animal, botanical, and with the aid of mechanical inventions. They used arsenic, sulphur (they called it brimstone), lime and nicotine; encouraged hedgehogs, bats, ladybugs (called lady-cows) and barn owls; grew hellebore, garlic, houseleek, and wormwood; created "skilful inventions" or "machines for destroying vermine" including mole and man traps. I'm convinced though, after reading these old books, that the most effective weapons of the early gardeners were ingenuity and energy. Unfortunately, few "wittie" helps are offered for the sources of these.

Taking our worn volumes in calloused hands, we vulgar readers find advice on pest control grouped by type of enemy rather than by method of attack. Let us begin our hostility against vermine with Richard Bradley's 1724 advice in *A General Treatise of Husbandry and Gardening* against moles: "Stoppeth the mouthes of the mole holes with Garlik, onion or leeke," "Bring up yong *[sic]* cats in their Garden-ground, and make tame Weasels." Take "a live Mole, and burning the powder of Brimstone about him, being in a deepe earthern pot, through which he is procured to crie, all others in the meane time as they report, are moved to resort thither." Mortimer's 1716 advice is "Take white Hellebore and the Roots of Palma Christi, and dry and powder them, and pass it through a fine Sive, adding to it Barley-meal and Eggs diluted with Wine and Milk, of which make a Paste, and divide it into little Pellets, which lay under the Mole-hills and it will kill them." Mole traps made from wood and string were called enticing engines. Better than trapping, however, cooperative community attack was reported in *Gleanings from Books on Agriculture and Gardening,* 1802: moles have been "Destroyed by several townships associating together, and engaging a mole-catcher, at the rate of four-pence per acre, for a term of seven years."

against moles

After reading of this cooperative venture among people, it came as a real shock to find in Loudon's 1834 edition of *An Encyclopedia of Gardening* the following notes under "Of engines for entrapping or destroying vermin, and for the defence of gardens": "Engine-traps for man are of two species, the common and the humane. The common man trap is a rat-trap on a large scale, differing from it only in the mode of setting; the former being baited and left loose, and the latter not being baited, but fixed to the ground by a chain.

against man

continued

Wittie helps continued

This is a barbarous contrivance, though rendered absolutely necessary in the exposed gardens around great towns. The humane man-trap, instead of breaking the leg by crushing, and consequently by the worst of all descriptions of compound fractures, simply breaks the leg, and therefore is comparatively entitled to the appellation of humane. It is not unfrequently set in market-gardens near the metropolis."

against ants

After that grisly paragraph it was a relief to switch to mere ants, and to find John Evelyn's advice in *Gard'ner's Almanac* for keeping them off fruit trees: "Encompass the Stem four Fingers breadth with a circle or Roll of Wool newly pluck'd from a Sheep's Belly, or lay saw-dust round the Tree. Also you may have Boxes . . . pierced full of holes with a Bodkin, into which Boxes put the Powder of Arsenick mingled with a little Honey: Hang these Boxes on the Trees, and they will certainly destroy them [ants] . . . Make not the Holes so large that a Bee may enter, lest it destroy them too."

against garden monsters

One strange all-purpose remedy for protecting seed "before committing it to the ground" is repeated by several authors. Thomas Hill passes it down in this form: "Seeds may be preserved in safety from all evill and Garden Monsters, if the bare head without flesh, of either Mare or shee Asse bee buried in the Garden."

against worms

Recipes recommended against worms "prejudicial in your garden" come from Mortimer's *Art of Husbandry* in 1716: "Water your Beds or Walks, with the Brine that you salted your Meat in, or with a strong Lixivium made of Ashes, or if you fill a Cistern or Trough with Water, and put into it a large quantity of Walnut Leaves, and let them steep a Fortnight or Three Weeks, till the Water is very bitter and it will kill them. Or you may lay Ashes or Lime about any Plant you desire to preserve from Snails or Worms, and they will not come near it; because the hot biting nature thereof hurts their tender Bodies."

against red spider

Along with brine, ashes and lime, tobacco was used in many ways by early gardeners. Bradley recommended "Tobacco Water (2 Hogsheads of Water infused with 6 or 7 pounds of Tobacco-Stalks)" in 1724 as "a sovereign Remedy against Insects, and especially those in the bark of Trees, as well as those in the Skins of Animals." In 1802, the following method of fumigating with tobacco was reported in *Gleanings from Books on Agriculture and Gardening:* "A kind of bellows has been invented by Mr. Green, of her Majesty's Flower Garden at Kew, to destroy the Red Spider, and other noxious insects in Hot-houses and Pinerys, with the fumes of burning tobacco." Tobacco as a controller of pests was steeped, burned and even spit. Bradley prints a letter to the editor in his 1724 *Experiments in Husbandry and Gardening* in which the correspondent describes his discovery of the power of tobacco by "A Man that chew'd Tobacco, who spit upon a Newt, and a Toad, and therby destroy'd them, from whence I suppos'd it a great Destroyer of all Sorts of Vermin."

against toads

It startled me to find newts, toads and even frogs classified as vermin. Thomas Hill's complaint against frogs in the *Gard'ner's Labyrinth* was mild: "Frogges . . . in Summer nights are wont to be disquieters to the wearied husbandmen, through their daily labour, by chirping and loud noise making." Heresbachius considers toads and frogs much more than just disturbers of his sleep: they threaten his precious bees! He writes in 1601 in *Foure Bookes of Husbandry:* "Beware betide, that there be no hurtfull creatures neere them [the bees] as the Tode, that with his breath doth both poison the Bee, and also draweth them to him." Mortimer is more specific: "Toads are easily destroyed in Summer Evening (by a Candle) creeping up and down the Walks and Passages about your House and Gardens."

against birds

Today there would be no debate about the beneficial, if minor, role of toads and frogs in the garden. Nor would there be many today who would choose to exclude birds from their gardens. We know, however, from the number of instructions like this one of Thomas Hill's, that birds were a real problem at seed-sowing time: "If a quantity of wheate or barley be boiled or infused in wine, and mixed with neesewort* as either the black or white, and the same sprinkled abroad by the pathes of the beds round about, it doth . . . defend the seeds sowne from the injurie of birds. But those being in a manner dead by eating of this, or at the least, starke drunke, he willeth then to hang up by the legges on a long rodde sticked in the earth, to the terror and fearing away of all other birds coming to the place." Gervase Markham in his 1613 *English Husbandman,* has a much jollier solution for bird problems: "You must have some boy or young fellow that must every morning from the dawning of the day till the Sunne be more than an houre high, and every evening from five of the clock till nine, runne up and downe your ground, whooping, showting and making of a great noyse." There were gardeners, though, who recognized that birds do more good than harm. This correspondent, in Bradley's 1724 *Experiments in Husbandry and Gardening,* is indignant about bird traps and speaks for "These Innocents who cannot speak for themselves." He produces statistics on a pair of sparrows with young: "20 Turns each per Hour; 40 caterpillars per Hour, 12 Hours of feeding per Day — 3360 Caterpillars destroy'd

*neesewort, *Veratrum nigrum,* used to induce sneezing.

by one Nest alone in one Week." Then he adds "I believe Most Birds feed 14 or 15 Hours per Day, whereas I have reckon'd but 12 . . . but I was willing to keep within Bounds."

Not only birds were championed for pest control; in 1802 hedgehogs were recommended in *Gleanings from books on Agriculture and Gardening:* "The keeping of a Hedgehog (it is said) will free kitchens from beetles, rats, and mice; this is supposed to be effected by the scent of the hedge-hog being obnoxious to them; for he will feed only on apples, or bread soaked in milk." The same book defends barn owls as being on the gardener's side, "as that bird beats the fields, as regularly as a spaniel, in quest of mice; and requires for the rearing of one brood of its young, many hundreds of mice."

By 1834 the thinking on wasps was changing and instead of paying a reward for every wasp's nest burned, Loudon's *Encyclopaedia* states: "Beneficial insects should be encouraged, as small, though powerful, auxiliaries in subduing those which are injurious . . . All the small and early wasps are highly useful in clearing fruit trees of innumerable small caterpillars." Also, "Were it possible to breed or domesticate in any way the lady-cow, our gardens would no longer be overrun with plant-lice (aphides)."

Leaving the attack on vermin and the recognition that many creatures are beneficial, let us consider some early advice on plant disease as described in Jethro Tull's 1733 *Horse-Hoeing Husbandry*. Tull says "Smuttiness is when the Grains of wheat instead of Flour are full of a black stinking powder" and writes "There are but Two Remedies proposed; and those are Brining, and change of seed. Brining of Wheat, to Cure or Prevent Smuttiness (as I have been credibly inform'd) was accidentally discover'd about Seventy Years ago, in the following manner: A Ship-Load of Wheat was sunk near Bristol in Autumn, and afterwards at Effs all taken up, after it had been soak'd in Sea-Water; but it being unfit for making of Bread, a Farmer sow'd some of it in a Field, and when it was found to grow very well, the whole Cargo was bought at a low Price by many Farmers, and all of it sown in different Places. At the following Harvest, all the Wheat in England happen'd to be Smutty, except the Produce of this Brined Seed, and that was all clean from Smuttiness." Tull also reports success from a farmer who does no brining but changes his source of seed every year. Tull ponders whether the drowned wheat flourished because of its salt bath or its foreign origin, and ends up recommending both brining and changing seed.



Tull's spirit of inquiry comes through as he sifts through the advice of the ancients and concludes "They were most accomplished Masters of the Art of Cheating themselves and us with Sound instead of Sence." This questioning of the "Wittie helps commended of the Ancients" is refreshing. Back in 1601, Heresbachius in his *Second Booke Entreating of the Order of Gardening* felt compelled to report an ancient Greek's solution for caterpillars: "Democritus writeth, that a woman in hir uncleanesse, ungirt, and hir heare hanging about hir shoulders, if she goe bare foote round about the place, the Caterpillers will presently fall." By 1840, in Loudon's *Encyclopaedia,* we have progressed from Democritus' fable to the call for scientific inquiry: "Insects are the most numerous, as well as most destructive foes to which gardens are exposed. The species are so many, and their devastation so varied, that without some acquaintance with their scientific classification, and a correct knowledge of their habits and economy, their operations can neither be understood nor effectually counteracted. It is therefore, the duty, not only of the intelligent agriculturist, but also of the gardener, to acquire both these branches of information."

This issue of the *Green Scene* has solicited readers' solutions for pest control, reviewed some ancient remedies, and has brought readers up to date on "the state of the art." Today's remedies for pests require less ingenuity and energy than did our forebears'. Few of us gather up snails and worms after each evening shower, or run through orchards with clappers or bury skulls in our gardens. Our present knowledge has evolved from the centuries of experimentation and inquiry of earlier gardeners. Let's hope our 20th century solutions make "more sence" than "sound."

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THE green scene

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